

p 1-46. North's Review

NIGERIA.
SOUTHERN PROVINCES.

ANNUAL
MEDICAL AND SANITARY REPORT
FOR THE
YEAR ENDED 31ST DECEMBER, 1914.

PRINTED BY
—WATERLOW & SONS LIMITED, LONDON WALL, LONDON.—
1915.

CONTENTS.

	PAGE
I. ADMINISTRATIVE—	
Staff	51
Financial	53
II. PUBLIC HEALTH—	
(a) General remarks	54
(i.) General diseases	54
(ii.) Communicable diseases	54
Mosquito or insect-borne—	
Malaria	54
Blackwater fever	54
Trypanosomiasis	55
Filariasis	55
Yellow fever	55
Infectious or epidemic—	
Beri-beri	56
Chicken-pox	56
Dysentery	56
Leprosy	56
Small-pox	57
Tuberculosis	57
Helminthic—	
Dracunculus	57
Ankylostomiasis	57
(b) European officials	58
Table showing the sick, invaliding and death rates of European officials ...	58
(c) Native officials	58
Table showing the sick, invaliding and death rates of native officials ...	58
(d) General European population	59
(e) General native population	59
Distribution of quinine to school children	59
Invalidings of Europeans	59
Deaths of Europeans	60
Invalidings and deaths of native officials	60
The Lagos Ladies League	60
Vital statistics, Lagos and Ebute-Metta	61

III. SANITATION—

(a) General review of work done, laws passed and progress made—

(I.) Administrative 62

(II.) Preventive measures 65

(1) Insect-borne diseases—

(A) Malaria 65

(B) Blackwater fever 69

(C) Yellow fever 69

(D) Filariasis 70

(E) Trypanosomiasis 71

(2) Infectious and epidemic diseases—

(A) Cerebro-spinal meningitis 71

(B) Cholera 71

(C) Dysentery 71

(D) Typhoid fever 72

(E) Plague 72

(F) Small-pox 75

Vaccination 76

(G) Varicella 76

(H) Venereal disease 76

(J) Tuberculous disease 76

(K) Pneumonia 77

(L) Rheumatic fever 77

(M) Leprosy 77

(3) Helminthic diseases—

(A) Ankylostomiasis 77

(B) Bilharzia 78

(C) Guinea worm 78

(D) Tæniasis 78

(E) Trichinosis 79

(F) Ascaris 79

(III.) General measures—

Clearance of bush, etc. 79

Disposal of refuse 79

Drainage 80

Regulation of buildings 81

Sanitary inspections and prosecutions 81

Sewage disposal 82

Town planning 82

Water supply 83

Railway sanitation 83

Infectious diseases hospitals 84

Sanitary stations 84

Sanitation of prisons 84

Markets 85

Slaughter houses 85

Segregation 85

(b) Measures to spread knowledge of hygiene and sanitation—

Lectures 86

School teaching, etc. 86


Example 86

(c) Recommendations for future work 86

IV. METEOROLOGY	...	...	...	...	...	...	...	...	PAGE 88
V. HOSPITALS AND DISPENSARIES—									
Lagos Hospital	...	...	...	...	...	...	...	...	89
Warri Hospital	...	...	...	...	...	...	...	...	90
Calabar Hospital	...	...	...	...	...	...	...	...	90
Ibadan Hospital	...	...	...	...	...	...	...	...	90
Ibadan concentration camp for prisoners of war	...	...	...	...	...	...	...	...	91
Onitsha Hospital	...	...	...	...	...	...	...	...	91
Sapele	...	...	...	...	...	...	...	...	92
Lunatic asylums	...	...	...	...	...	...	...	...	92
Leper	...	...	...	...	...	...	...	...	92
Infectious Diseases Hospital, Lagos	...	...	...	...	...	...	...	...	92
Quarantine Station, Lagos	...	...	...	...	...	...	...	...	92
VI. SCIENTIFIC—									
Ankylostomiasis	...	...	...	...	...	...	...	...	93
Trypanosomiasis	...	...	...	...	...	...	...	...	94
Blackwater fever	...	...	...	...	...	...	...	...	94
Papers published	...	...	...	...	...	...	...	...	94
RETURNS—									
TABLE I.—Staff	...	...	...	...	...	...	...	...	95
„ II.—Financial	...	...	...	...	...	...	...	...	99
„ III.—Statistics of population	...	...	...	...	...	...	...	...	102
„ IV.—Summary of routine sanitary work done during the year	...	...	...	...	...	...	...	...	103
TABLES VI. & VII.—Yearly return of patients	...	...	...	...	...	...	...	...	113

APPENDIX.

I.—Report of the Director, Medical Research Institute	...	...	...	...	122
II.—The Transmission of <i>Trypanosoma brucei</i> of Nigeria by <i>Glossina tachinoides</i> , with some Notes on <i>Trypanosoma nigeriense</i>	...	...	...	...	144
III.—Report of an Investigation into the Prevalence of Trypanosomiasis in Itu and Ikot-ekpene	...	...	...	...	148
IV.—Report on Trypanosomiasis—Obudu District	...	...	...	...	154
V.—Ankylostomiasis Report	...	...	...	...	156
VI.—Notes on some Interesting Cases	...	...	...	...	163
VII.—Fifteenth Annual Report on the Work done in the Chemical Laboratory	...	...	...	...	166
VIII.—Report of the Government Dentist	...	...	...	...	167
IX.—A General Description of Lagos Island	...	...	...	...	168
X.—A List of Blood-sucking Insects identified at various Stations in the Southern Provinces	...	...	...	...	173
XI.—A List of Surgical Operations performed at the principal Hospitals	...	...	...	...	181
XII.—Malarial Fever Tables	...	...	...	...	185
XIII.—Trypanosomiasis and Blackwater Fever Tables	...	...	...	...	186
XIV.—Yellow Fever and Filariasis Tables	...	...	...	...	187
XV.—Tables showing quantity of Quinine issued Gratis and Results of Vaccination	...	...	...	...	188



Digitized by the Internet Archive
in 2019 with funding from
Wellcome Library

<https://archive.org/details/b3163882x>

NIGERIA.

SOUTHERN PROVINCES AND COLONY.

ANNUAL

MEDICAL AND SANITARY REPORT

FOR THE
YEAR ENDED 31ST DECEMBER, 1914.

I.—ADMINISTRATIVE.

STAFF.

The Medical Staff consists of :—

- 1 Principal Medical Officer.
- 2 Senior Medical Officers, Grade I.
- 1 Senior Sanitary Officer.
- 1 Senior Medical Officer, Grade II.
- 4 Senior Medical Officers, Grade III.
- 3 Sanitary Officers.
- 65 Medical Officers.
- 3 Native Medical Officers.

One Medical Officer was seconded for duty at the Colonial Office in 1913 and has since remained seconded.

The following Medical Officers were newly appointed :—

Dr. W. H. Kauntze.	Dr. C. J. B. Pasley.
Dr. A. R. Paterson.	Dr. C. Mackey.
Dr. E. Gibson.	

Also the following Native Medical Officers :—

Dr. S. Kapo.	Dr. K. Faderin.
--------------	-----------------

The following promotions took place :—

Dr. T. Hood, Principal Medical Officer, to be Director, Medical and Sanitary Service of Nigeria.

Major W. H. G. H. Best, R.A.M.C. (S.R.), Senior Medical Officer (Grade I.), to be Principal Medical Officer.

Dr. H. B. S. Montgomery was transferred on promotion from the Gold Coast to be Deputy Principal Medical Officer, 10th October, 1914.

Dr. W. I. Taylor was promoted to be Senior Medical Officer, Grade II., and transferred from the Northern Provinces, 1st January, 1914.

Dr. J. W. Collett was promoted to be Senior Medical Officer, Grade II., and transferred from Sierra Leone, 14th December, 1914.

Dr. O'Dea was promoted to be Senior Medical Officer, Grade III., 1st January, 1914.

Dr. T. B. Adam was promoted to be Senior Medical Officer, Grade III., 5th August, 1914.

Drs. J. M. Dalziel and W. D. Inness were promoted to be Sanitary Officers, and transferred from the Northern Provinces, on 29th March and 1st August, 1914, respectively.

The following other transfers took place :—

Dr. Burrows to Sierra Leone, 20th December, 1914.

Dr. Collier to the Gold Coast, 5th August, 1914.

Dr. A. F. Kennedy from the Gambia, 26th August, 1914.

Dr. J. W. S. Macfie to the Gold Coast, as Pathologist, 29th July, 1914.

Dr. J. R. P. Allin to the Northern Provinces, 18th February, 1914.

Drs. Pasley and Kelsall were temporarily transferred to the Northern Provinces, the former on 29th June, 1914, and the latter on 4th July, 1914, and have since returned on 7th October, 1914, and 21st November, 1914.

Termination of appointment :—

Dr. S. Kapo.

Deaths :—

Dr. E. J. H. Garstin, Medical Officer, 4th June, 1914.

Dr. D. Mackinnon, Medical Officer (died while on leave).

Resignations :—

Dr. E. J. Wyler, Medical Officer, 27th January, 1914.

Dr. A. Hutton, Medical Officer, 11th March, 1914.

The services of the following officers were placed at the disposal of the War Office :—

Lieut. (now Capt.) J. B. Bate, R.A.M.C. (T.), Medical Officer.

Dr. D. T. Birt, Medical Officer.

EUROPEAN NURSING STAFF.

The staff consists of :—

2 Senior Nurses ; 15 Nurses.

New appointments :—

Miss M. Jacomb ; Miss L. A. M. Warner ; Miss M. G. Graham ; Miss F. C. Homan.

Invalidings :—

Miss R. M. Burns and Miss L. A. M. Warner.

At the outbreak of war large demands were made on the personnel of the Medical Department, in order to meet which it became necessary to

withdraw Medical Officers from several of the less important stations, viz. :— Afikpo, Abakaliki, Obudu, Obubra, Onitsha (2nd M.O.), Agbor, Warri (2nd M.O.), Forcados (2nd M.O.), Ibadan (2nd M.O.), Badagry, Epe, Yaba Asylums, Okigwi, Lagos (two Native M.O.'s).

The following officers served for varying periods with the Cameroons Expeditionary Force :—

Major W. H. Best, P.M.O.	Dr. A. F. Kennedy, M.O.
Dr. T. B. Adam, S.M.O.	Dr. T. L. Craig, M.O.
Dr. E. H. Tipper, M.O.	Dr. J. S. Smith, M.O.
Dr. H. M. Newport, M.O.	Dr. H. H. Stewart, M.O.
Dr. T. M. R. Leonard, M.O.	Dr. T. H. Suffern, M.O.
Dr. E. C. Braithwaite, M.O.	Dr. A. R. Paterson, M.O.
Dr. J. J. Moore, M.O.	Dr. R. C. Macpherson, M.O.
Dr. M. E. O'Dea, S.M.O.	Capt. E. L. Anderson, M.O.
Dr. C. W. O'Keeffe, M.O.	Dr. T. H. Rankin, M.O.
Dr. L. H. Booth, M.O.	Dr. E. J. J. Quirk, M.O.
Dr. W. H. Seiger, M.O.	Dr. W. S. Clark, M.O.
Dr. G. Wilson, M.O.	Dr. T. R. Sandeman, M.O.
Dr. F. Ross, M.O.	Dr. K. Manson, M.O.
Dr. H. R. Morehead, M.O.	Dr. H. R. M. Ferguson, M.O.
Sergt. Prince, R.A.M.C.	Miss L. A. M. Warner, Nurse.
Sergt. Payne, R.A.M.C.	Miss E. K. Nevill, Nurse.
Miss McCotter, Nurse.	Miss E. Phillips, Nurse.
Miss L. M. Single, Nurse.	

Dr. H. R. Morehead also proceeded with Nigerian troops to Togoland.

Dr. W. S. Clark was captured by the Germans at Ossidinge on 6th September, and was released on 19th October.

Dr. L. H. Booth was awarded the medal and certificate of the Royal Humane Society for courageous conduct in saving a native from drowning in the Warri river.

FINANCIAL.

STATEMENT OF REVENUE FOR THE YEAR 1914.

Head and Sub-heads.

Head 2.					
Item 10.	Hospital and Medical Receipts	...	...	£3,077	6 8

ESTIMATED REVENUE.

Hospital and Medical Receipts	£2,500	0 0
-------------------------------	-----	-----	-----	-----	--------	-----

STATEMENT OF EXPENDITURE FOR THE YEAR 1914.

			Estimate.			Actual Expenditure.
Medical and Laboratory...	...	£91,899	0 0	...	£81,545	15 10
Sanitary ... ..	...	18,456	0 0	...	12,785	7 1
Medical Research Institute	...	2,196	0 0	...	1,768	6 9
Special Warrants ... ..	...	4,625	0 3	...	—	
Total ... ..	...	£117,176	0 3	...	£96,099	9 8

II.—PUBLIC HEALTH.

(a)—GENERAL REMARKS.

A detailed and complete statement of the public health, especially in regard to the native, and in a less degree to the European non-official population, is still impossible, because in many districts registration is not compulsory, and where it is the inhabitants have not conformed to its regulations. As Medical Officers have often observed, the native is inclined to be secretive with regard to his ailments, and, in consequence, the scanty information available only touches a small proportion of the community and represents, as a matter of fact, only those diseases from which they suffer which have been treated by a Medical Officer and thus appear in the official returns. Compulsory registration has been in force for some years in Lagos and Ebute-Metta, but even the figures from these places must be accepted with caution, as but a small percentage are ever seen by a qualified medical practitioner.

It may, however, be said that the sick returns for the year under review show that the general health compares very favourably with last year, both for Europeans and natives.

(i.) GENERAL DISEASES.

The most common diseases are :—Pneumonia, constipation and diarrhoea, anæmia, neuralgias and rheumatic affections. Pneumonia is one of the most serious acute diseases from which the native suffers. It is most common during the cold harmattan season. There were 339 cases reported, with a mortality of 14·7 per cent.

(ii.) COMMUNICABLE DISEASES.

Mosquito or Insect-borne.

Malaria.—The following table shows the percentage of malaria to the total number of diseases treated for the last eight years :—

1907	...	...	...	7·9	per cent.
1908	...	...	...	7·3	per cent.
1909	...	...	...	7·12	per cent.
1910	...	...	...	7·57	per cent.
1911	...	...	...	8·0	per cent.
1912	...	...	...	8·18	per cent.
1913	...	...	...	7·45	per cent.
1914	...	...	...	6·0	per cent.

There were no deaths among officials. Three deaths occurred among European non-officials. A report of these cases will be found in the Report of the Director, Medical Research Institute, for the year.

Blackwater Fever.—Eight European officials suffered from this disease, of whom two died. A case was also reported as occurring in a West Indian railway official at Aro, who recovered. Another case, returned as “native,” was that of a Syrian who died at Ibadan. Twelve cases occurred in European non-officials, with three deaths.

Trypanosomiasis.—One case in a European official was treated at the Lagos Hospital. Infection, however, did not occur in the Southern Provinces, but at Yola, whence the patient, having been invalided, was *en route* for England. Two fatal cases in natives were also imported from the Northern Provinces; one was under treatment in the Lagos Hospital and came from the Benue river, the other at Forcados, but it is not certain from what part of the Northern Provinces he came. All other cases were treated in the Sleeping Sickness Camp at Eket, or in the Cross River District.

Filariasis is fairly widespread throughout the country, but *Microfilaria* appears to give rise to no marked pathological sequelæ in the majority of cases. The adult *loa* causes inconvenience in the conjunctiva, and is also responsible for the condition known as "Calabar swelling."

The returns give but a very imperfect idea of the prevalence of this parasite, as cases rarely present themselves for treatment except for some concurrent ailment.

Elephantiasis, especially of the scrotum, is moderately common, and its surgical treatment attended with much success and is greatly appreciated by the sufferers.

Yellow Fever.—Yellow fever appeared in Nigeria in 1914 after a period of quiescence following the outbreaks of 1913, the first case being reported from Warri. Five cases of pyrexia occurred on board the s.s. "Arnfried." Only one of these, however, proved to be yellow fever, and it was of a mild type. Two of the others were regarded as suspicious, and the remaining two proved to be malaria.

The second case occurred near Onitsha, and was not under medical treatment, the patient having died between Oguta and Onitsha on the way to hospital. A post-mortem examination was made and a diagnosis of yellow fever arrived at. Infection in this case appears to have taken place somewhere between Oguta and Degema.

The next two cases occurred in Lagos; one an engineer on board one of Messrs. Elder, Dempster & Co.'s branch boats, the other in one of the areas in which cases had occurred in 1913. Both were admitted to the Lagos Hospital and both recovered.

Lagos was immediately put in quarantine and strict measures for the prevention of the spread of the disease adopted. An infected area was declared and all the residents were put under surveillance, while all the inhabitants of the house and ship from which the cases were removed were isolated and kept under observation for the usual period. No further cases occurred and quarantine was raised on 4th March.

On March the 8th a European employé of the railway at Ebute-Metta was sent into hospital suffering from pyrexia, which on examination proved to be yellow fever. The patient was a newcomer to Nigeria and had been only three weeks in the country. He made an uninterrupted recovery.

A sixth case was reported from Forcados on March 27th, that of a seaman who died on board the s.s. "Nembe" while at Forcados. The case proved fatal and the diagnosis was confirmed by post-mortem.

On 25th April the death was reported of a seaman on board the s.s. "Yola" at Calabar, and the diagnosis of yellow fever was made after a post-mortem examination. The patient did not come under treatment. Although death took place at Calabar, infection probably occurred at Bonny. The ship was fumigated and all necessary precautions carried out.

A further fatal case was reported as occurring in a sailor on board the s.s. "Ashanti," on 22nd October, at Burutu. The diagnosis was confirmed by post-mortem examination. The ship was fumigated, all contacts kept under observation, and the usual precautions for the prevention of spread taken.

No further cases have been reported. All these cases were Europeans and, excepting the one case from Ebute-Metta, sailors and non-officials.

Infectious or Epidemic Diseases.

Beri-beri.—There is a large increase in the number of cases of this disease reported, almost altogether from the Cross River districts. 227 cases occurred, with 5 deaths. There were no cases in Europeans. Interesting notes on a case in a European which had come from Ofun-Atam on the Cross River, where other Europeans had suffered what was supposed to be beri-beri, will be found included in this report (page 164).

Chicken-pox is endemic, and epidemics of varying intensity are reported from time to time from different parts of the country, but give rise to no great inconvenience. There is in this country a variety of varicella in which the pock is indistinguishable from variola, for which it is sometimes mistaken. The constitutional symptoms are always slight and recovery is constant. It has no influence on subsequent vaccination, but its occurrence sometimes after vaccination has considerable influence in destroying the faith of the native in the protection afforded by vaccination.

Dysentery shows an increase over last year of 263 cases, though the mortality was practically the same. An epidemic was reported as occurring in the Udi prison; there were nine deaths. Emetine has been largely used in treatment, with good results, but until more systematic methods are adopted to determine whether the cases are bacillary or amœbic it will be difficult to appreciate the value of emetine to the full.

Leprosy.—Nearly 90 per cent. of the cases of leprosy occur on the river Niger in the neighbourhood of Onitsha, while the Eastern Provinces appear to be almost free from the disease.

A scheme was introduced during the year for a modified system of segregation and isolation in those parts of the country where leprosy is most common, namely, the establishment of leper settlements or "villages," principally in the neighbourhood of the larger towns. These villages were to be essentially native, established and maintained by the native community, whose sympathies with the scheme every endeavour was made to enlist. Farm land where possible was to be allotted, and such of the inmates as were able encouraged to assist in their maintenance by working it; food and other necessities were to be provided by the chiefs or relatives of the lepers. Isolation in the earlier stages of the scheme was not to be rigidly enforced, in order that encouragement might be given to the people to come to the villages, and to avoid creating in their minds any idea of excessive compulsion or restraint. It was anticipated that once the scheme was fairly established more efficient isolation might be enforced and intercourse between the leprous and non-leprous gradually reduced to a minimum.

At Ibadan, although there are not a great many lepers there, the scheme was welcomed by the chiefs and there is every prospect of the villages becoming a success. In the Onitsha Province, where the disease is most prevalent, in addition to the already existing settlements, work has been pushed on and sites chosen and houses erected at Agulere, Awka, Udi and Idah. In this province, however, native co-operation appears to be lacking in many cases, though probably in time it will be secured. This lack of

co-operation from those whom the scheme will benefit is reported from Warri, Jebu Ode, Abeokuta and Owerri, and it is probable that in these provinces some form of legislation will be necessary to make the scheme a successful one.

Small-pox.—There was but one epidemic, *viz.*, that in the Ekiti country. Drs. Kelsall, Pasley and Faderin visited the district at different times, taking with them additional vaccinators, to investigate and report, and although the epidemic seemed to be on the wane, judging from the result of their enquiries, the outbreak appears to have been a severe one.

That this district should be singled out for a small-pox visitation is not surprising, it being the last stronghold of what remains of the now, happily, almost extinct Shopono, or small-pox worship, which was once the scourge of Yoruba Land, and which has been driven back from Lagos, Abeokuta and Ibadan. Action is now being taken by Government to stamp out what remains of this pernicious juju in the Ekiti country.

As for the rest of the country, only a few sporadic cases have been reported.

Tuberculosis.—3 cases occurred in European officials, of which 2 were invalided; 3 occurred in non-officials, with one invaliding. There were no deaths.

Among natives there were 109 cases, with 23 deaths. Of these, 3 were officials, 1 of whom was invalided and 1 died.

The average percentage of tuberculosis cases to other diseases treated (including both Europeans and natives) for 1907 to 1913 was just under .17. That for 1914 was .13.

Helminthic Diseases.

Parasitic worms are a good deal more common amongst the native inhabitants than one would be led to suppose from the sick returns. No precautions are taken, and infection is almost universal—the host living, for the most part, in happy tolerance of the parasites. *Ascaris*, *Tænia* and *Tricocephalus* are very wide-spread and generally remain untreated.

Dracunculus.—This parasite is responsible for a large amount of sickness and inefficiency, especially amongst troops and carriers in the “bush.” It is more common in the interior than on the coast line, the Niger district being comparatively free from it. The only, and certain preventive of the disease, *viz.*, abstaining from drinking unboiled or unfiltered water, is almost impracticable for soldiers and carriers on the march, who, when thirsty and water scarce, as it generally is, will drink from any puddle they pass by the roadside.

Ankylostomiasis.—A systematic investigation of the prevalence of this disease was instituted in 1914, and is to be continued in 1915, with a view to determining, if possible, to what extent this disease and malaria were responsible for the anæmia so common to the country, and drawing conclusions as to the efficacy of treatment by thymol and other drugs. The investigation has been beset with some difficulty, principally due to inability to keep in touch with the cases. Observations have therefore been practically confined to prisoners and hospital patients, but it is with regard to children that the most difficulty has been experienced.

There is no doubt that the disease is very wide-spread, the percentage of infection in cases examined varying from nil to 50, 80, and even 100. The average number infected works out at about 43 per cent. Europeans are practically exempt.

(b)—EUROPEAN OFFICIALS.

The principal diseases treated in European officials were malaria, blackwater fever, dysentery, rheumatic fever, anæmia, neuritis and neuralgia. Diseases and minor ailments of the digestive apparatus and skin diseases also account for a large number of the cases. On the whole the health has been fair. There were 8 cases of blackwater fever, 2 of which died, 4 were invalided and 2 went on leave when due.

TABLE SHOWING THE SICK, INVALIDING AND DEATH RATES OF EUROPEAN OFFICIALS.

	1911.	1912.	1913.	1914.
Total number of officials resident	1,372	2,068	2,146	1,740
Average number resident	595	801·2	842·52	822·33
Total number on sick list	461	709	676	745
Total number of days on sick list	4,525	5,285	5,044	4,488
Average daily number on sick list	4·04	4·71	4·6	12·3
Percentage of sick to average number resident...	77·4	88·49	133·4	90·6
Average number of days on sick list for each patient	9·8	7·4	7·3	6·0
Average sick time to each resident	7·6	6·5	8	5·4
Total number invalided	41	57	52	41
Percentage of invalidings to total residents ...	2·9	2·75	2·28	2·4
Total deaths	9	9	5	5
Percentage of deaths to total residents	·6	·43	·17	·28
Percentage of deaths to average number resident	1·5	1·12	·85	·6
Number of cases of sickness contracted away from residence	—	2	4	1

A list of the causes of invalidings and deaths will be found on the two following pages, 59 and 60.

(c)—NATIVE OFFICIALS.

The principal diseases were dysentery, pneumonia, malaria, anæmia, rheumatism, heart disease, diseases of the respiratory and digestive systems, inflamed glands, abscesses and skin diseases. One case of blackwater fever occurred in a West Indian and recovered.

TABLE SHOWING THE SICK, INVALIDING AND DEATH RATES OF NATIVE OFFICIALS.

	1911.	1912.	1913.	1914.
Total number of officials resident	368	1,457	2,832	2,180
Average number resident	249·23	958·4	2,384·56	1,706·30
Total number on sick list	333	883	810	1,268
Total number of days on sick list	1,634	4,318	9,707	6,867
Average daily number on sick list	·75	5·85	8·8	18·8
Percentage of sick to average number resident ...	133·61	92·13	33·96	74·3
Average number of days on sick list for each patient	4·90	4·89	11·97	5·4
Average sick time to each resident	6·55	4·50	4	4·02
Total number invalided	2	7	7	7
Percentage of invalidings to total residents ...	·54	·48	·24	·30
Total deaths	2	6	17	6
Percentage of deaths to total residents	·54	·41	·60	·27
Percentage of deaths to average number resident	·80	·62	·71	·35
Number of cases of sickness contracted away from residence	—	2	1	1

(d)—GENERAL EUROPEAN POPULATION.

As previously stated, reliable statistics under this head are difficult to obtain. Until the middle of the year a large number of European non-officials were treated at the Lagos Hospital. Since the opening of a private hospital in Lagos, however, this number is reduced to almost nil. A very slightly larger number come under treatment than is the case with officials, but the invaliding and death rate is higher; the latter 1·0 per cent., as compared with 0·32 per cent., due probably to longer tour of service, poor housing and lack of strict medical supervision. A list of invalidings and deaths, so far as is known, will be found below.

(e)—GENERAL NATIVE POPULATION.

Of the general native population 78,239 cases were treated, with 533 deaths, or a mortality of 0·68 per cent. In 1913, 89,856 cases were treated, with 670 deaths, or a mortality of 0·74 per cent. The large decrease of attendance of native patients, where an increase is usually expected, can be explained by the withdrawal of many Medical Officers from their stations on account of the war. Further, native officials are excluded from the figures for 1914, while they are included in 1913.

The total number of attendances at hospitals and dispensaries was 418,397.

DISTRIBUTION OF QUININE TO SCHOOL CHILDREN.

In August a scheme was inaugurated for the free distribution of quinine to school children, good results having been obtained in other colonies from a similar measure. A sum of £780 was provided by Government for the purpose of purchasing quinine; and the co-operation of representatives of the various missions having been obtained, quinine in 3-grain sugar-coated tabloids was issued to Medical Officers in the districts for distribution to the schools—a 3-grain tabloid to be administered to each child once a week.

The scheme has been in operation hardly long enough for definite conclusions to be arrived at as to its effect, but the reports received from Medical Officers up to the end of the year are most encouraging, it being said that the children themselves are fond of the medicine and ask for it, and appear to believe that it does them good. As far as can be at present ascertained, they suffer less from fever and the number of scholars unable to attend school through illness has become appreciably less.

INVALIDINGS OF EUROPEANS, 1914.

Cause.					Officials.	Non-officials.	
Dysentery	...	...	...	...	1	...	2
Malaria	...	...	...	...	—	...	11
Blackwater fever	...	...	...	...	4	...	2
Pneumonia	...	...	...	...	—	...	1
Syphilis	...	...	...	...	1	...	1
Tuberculosis	...	...	...	...	2	...	1
Alcoholism	...	...	...	...	—	...	1
Anæmia	...	...	...	...	3	...	3
Rheumatism	...	...	...	...	1	...	—
Neuritis	...	...	...	...	2	...	1
Epilepsy	...	...	...	...	1	...	—
Neurasthenia	...	...	...	...	2	...	—
Mania	...	...	...	...	—	...	1
Melancholia	...	...	...	...	2	...	—
Delusional insanity	...	...	...	...	1	...	—
Iritis	...	...	...	...	1	...	—
Carried forward					21	...	24

INVALIDINGS OF EUROPEANS, 1914—*continued*.

Cause.	Brought forward				Officials.	...	Non-officials.
					21	...	24
Valvular disease of the heart	...				1	...	1
Gastritis	—	...	2
Appendicitis	3	...	1
Colitis	—	...	1
Hæmorrhoids	1	...	—
Liver abscess	1	...	—
Hepatitis	—	...	1
Jaundice	—	...	1
Peritonitis	1	...	—
Fistula	1	...	—
Splenitis	—	...	1
Acute nephritis	—	...	1
Calculus	2	...	—
Cystitis	1	...	—
Prostatitis	—	...	1
Arthritis	1	...	—
Cellulitis	—	...	1
Abscess	—	...	1
Boils	2	...	—
Psoriasis	1	...	—
Ulcers	1	...	—
Injuries	1	...	2
Sun trauma	2	...	—
Other causes	1	...	7
Total					41		45

DEATHS OF EUROPEANS, 1914.

Cause.					Officials.	...	Non-officials.
Malaria	...	...	...	...	—	...	3
Blackwater fever	...	...	...	...	2	...	3
Measles	...	...	...	...	—	...	2
Septicæmia	...	...	...	...	1	...	—
Yellow fever	...	...	...	...	—	...	4*
Neuritis	...	...	...	...	1	...	1
Meningitis	...	...	...	...	—	...	1
Enteritis	...	...	...	...	—	...	1
Injury	...	...	...	...	1	...	—
Other causes	...	...	...	...	—	...	2
Total					5		17

The causes of invalidings among native officials were pneumonia, tuberculosis, rheumatism, valvular disease of the heart, enteritis and nephritis and other causes (one each). The causes of death were dysentery, tetanus, tuberculosis, bronchitis, nephritis and pyelitis (one each).

THE LAGOS LADIES LEAGUE.

The Lagos Ladies League, a band of ladies organised in 1901 by the then Governor, Sir William MacGregor, for the purpose of providing medical attendance, distributing quinine, providing nursing and food and the general

* Two of these cases were not attended by a Medical Officer.

care of the sick poor in Lagos, particularly infants, and for the instruction and dissemination of a knowledge of the rudiments of hygiene and simple methods of treatment of disease, did excellent work up to the end of 1913, after which the work seems to have ceased abruptly for reasons which are still somewhat obscure, but perhaps largely due to the death of the President of the League, whose devotion to the work was well known.

At the end of 1913 the League was revived, a meeting of the members called by His Excellency the Governor-General, and, with the co-operation of the various religious bodies and Government aid in the form of free supply of quinine and the services of a native Medical Officer, an endeavour was made to put the League on a sound working basis. Considerable enthusiasm was shown in the first half of the year 1914, but up to the present, due no doubt largely to the outbreak of the war and the unavoidable withdrawal of the Medical Officer who had been detailed for the work, the results have not been encouraging.

VITAL STATISTICS.

LAGOS, 1914.

Number of deaths of children under five years of age	...	...	828
Percentage of deaths of children under five years to total number of deaths	...	...	47.7
Death rate of children under one year per 1,000 births	...	...	269.7

EBUTE-METTA, 1914.

Number of deaths of children under five years of age	...	...	129
Percentage of deaths of children under five years to total number of deaths	...	...	41.8
Death rate of children under one year per 1,000 births	...	...	284.8

LAGOS.

Year.	Total births.	Birth rate per 1,000.	Total deaths.	Death rate per 1,000.	DEATHS.						Total deaths under 5 years.	Rate per 1,000.	Total still-births not included in return.	Estimated population.
					Under 1 year.	Rate per 1,000.	Between 1 and 2 years.	Between 2 and 3 years.	Between 3 and 4 years.	Between 4 and 5 years.				
1909	2,312	43.3	1,975	37.0	729	13.6	135	90	52	49	1,055	19.4	155	53,299
1910	2,389	44.2	1,937	35.8	774	14.3	78	61	54	44	1,011	18.7	123	53,986
1911	2,430	39.8	1,873	30.7	692	11.3	74	54	38	31	889	14.5	132	61,000
1912	2,391	39.1	1,829	29.9	670	10.9	108	50	29	35	892	11.3	118	61,000
1913	2,437	38.02	1,867	29.1	643	10.03	103	85	53	33	917	14.3	129	64,096
1914	2,261	35.2	1,735	27.06	610	9.5	88	58	35	37	828	12.9	111	64,096

EBUTE-METTA.

Year.	Total births.	Birth rate per 1,000.	Total deaths.	Death rate per 1,000.	DEATHS.						Total deaths under 5 years.	Rate per 1,000.	Total still-births not included in return.	Estimated population.
					Under 1 year.	Rate per 1,000.	Between 1 and 2 years.	Between 2 and 3 years.	Between 3 and 4 years.	Between 4 and 5 years.				
1909	264	35.2	284	38.2	83	11.1	12	11	1	2	109	14.6	21	7,417
1910	262	32.3	325	40.1	83	10.2	20	4	7	2	116	14.3	17	8,104
1911	288	24.0	317	26.4	91	7.5	12	4	2	7	116	9.6	22	12,000
1912	315	26.2	346	28.8	71	6.9	21	10	6	11	119	9.9	28	12,000
1913	327	25.9	311	24.6	83	6.5	19	5	3	9	119	9.4	25	12,609
1914	337	26.7	308	24.4	96	7.6	14	9	7	3	129	10.2	17	12,609

III.—SANITATION.

(a)—GENERAL REVIEW OF WORK DONE, LAWS PASSED, AND PROGRESS MADE.

(I.)—ADMINISTRATIVE.

1.—*The sanitary authority.*—The Sanitary Branch of the Medical and Sanitary Department, with its headquarters in Lagos town, is the responsible authority on all matters relating to sanitation and public health in the Southern Provinces and Colony of Nigeria, which comprise a population of 7,891,000 natives and 1,899 non-natives, and cover an area of 80,000 square miles.

2.—*Additions to headquarters staff.*—During the year 1914 two additional Sanitary Officers were appointed, one of whom devotes his entire time to the sanitation of the area known as the Lagos Sanitary District, which includes Lagos, Ebute-Metta, Iddo and Apapa, and over which the Lagos Municipal Board exercises jurisdiction. The other officer acts as relief to the former and to the first appointed Sanitary Officer.

Hitherto the appointments of Health Officer to the Municipal Board and acting Sanitary Officer were filled by members of the Medical Staff holding a Public Health qualification.

3.—*Effect of additional staff on sanitary organisation and development.*—While the new arrangement may be found to work better in practice, it does not materially assist in relieving the pressure of office work, which is mainly responsible for preventing the more senior officers from visiting many places which lie in need of better sanitary organisation and further development. However, visits are paid as frequently as possible under the circumstances, and such places as are fortunate enough to come under observation are thoroughly inspected and have full reports made on their condition, recommendations being added for their present and future improvement.

In our survey of the various districts and stations we are largely aided by the local Executive Officer and the Medical Officer, who also acts as Health Officer for his district.

4.—*Sanitary staff of towns.*—Lagos, the largest and most important coast town in Nigeria, is the only place at present in possession of a Health Officer who devotes his whole time to sanitation. It is adequately supplied with Sanitary Inspectors, who are allotted particular divisions and sub-divisions, for which they are held responsible.

These inspectors have under their supervision a certain number of Assistant Sanitary Inspectors and labourers who aid them in their work, the object being to provide an adequate staff, and so to distribute it that the whole town shall be thoroughly inspected at least once a week.

Other places are provided with a staff suitable to their requirements, the end aimed at being precisely the same in each case.

5.—*Duties of Sanitary Inspectors.*—The duties of Sanitary Inspectors, who may or may not have under their control a number of Assistant Inspectors, resolve themselves into (a) inspection of compounds and their surroundings, and advising the inhabitants as to their responsibilities, and (b) taking due cognisance of any persistent defaulters, and bringing them, as occasion arises, to the notice of the Health Officer, who decides whether the offence against the Health Ordinance is such as to necessitate a summons being issued. In

the course of their investigations particular attention is paid to the cleanliness of houses and compounds, their drainage, the condition of wells, tanks and gutters, the prevention of mosquito breeding inside and outside of compounds, and rat destruction.

The presence of infectious disease in a compound is noted, and the necessary measures adopted to prevent spread of the infection.

6.—*Sanitary supervision.*—The supervision of all sanitary work at stations outside Lagos devolves upon the Medical Officers, who are always anxious to make improvements and carry out any suggestions which may be advanced.

7.—*European Sanitary Inspectors.*—In Lagos it has generally been found advantageous to keep one or more European Sanitary Inspectors to assist the Municipal Sanitary Officer and supervise special Sanitary Inspectors and gangs of labourers whose services are entirely employed in anti-plague and anti-yellow-fever work along the Marina and the low-lying eastern part of the town. A European Inspector when not employed in Lagos was posted to one or other of the larger stations, such as Calabar, Forcados or Onitsha, and received instructions as to his duties from the Health Officer of the place to which he was appointed.

8.—*District reports.*—Monthly Municipal Sanitary and Engineering reports are prepared in Lagos, and from outside centres quarterly statistical and sanitary returns are received. The latter, although not very pretentious in character, frequently contain useful information by indicating the present and future requirements of a station.

9.—*Sanitation of a town under a native government.*—The sanitation of Ibadan, a large, compact, well-defined town, with a population of 175,000 natives, and having its own native government acting under the advice of a Nigerian Commissioner with a keen interest in all sanitary matters, is carried out through the heads of quarters or divisions of the town, these heads being responsible for their own areas, and having their instructions executed by Akodas, a sort of native police of whom there are 60 in all; 14 of them being entirely employed in doing sanitary work, which chiefly consists in instructing the natives where and when to dig salgas and how to dispose of their refuse, and in informing the Medical Officer when a case of infectious disease is found.

While it must be admitted that these men, most of them quite illiterate, have by their devotion to duty brought about a great improvement in the sanitary condition of Ibadan, they require to be further instructed in preventive measures, and how to deal effectively with cases of infectious disease.

10.—*Inspectors-in-Training.*—Towards the end of the year ten youths were appointed as Sanitary Inspectors-in-Training, and a beginning was at once made by giving them lectures and practical instruction. When their three years' course of training is completed positions which become vacant or are occupied by very inferior men will be handed over to them.

By engaging and instructing young men we hope eventually to have a staff of highly competent Inspectors completely equipped for their work, from whom we shall expect much better results than we can possibly get at present.

The expense to Government incurred in the preparation of these young men for important posts and the increase of expenditure through augmented salaries cannot altogether be ignored, but their capacity for useful work being increased should, if our expectations are fulfilled, amply repay for any extra outlay involved in their training.

11.—*Regrading of Sanitary Inspectors.*—As a necessary preliminary to embarking on this course, the Governor-General concurred in the suggestion made by the Lieutenant-Governor of the Southern Provinces that a regrading

scheme for native Sanitary Inspectors should be drawn up and submitted for approval.

The future establishment agreed upon was 3 first class, 6 second class, 20 third class Sanitary Inspectors, and 18 Sanitary Headmen; the last-named not being required to undergo a three years' course of training, as they are meant to be employed only in very small stations to supervise labour.

The salaries of Inspectors-in-Training and Sanitary Headmen were laid down at £35-5-50 per annum, and those of first, second and third class Inspectors at £96-6-150, £60-6-90 and £35-5-50 per annum, respectively, which is a very liberal increase on the present scale of salaries and places Sanitary Inspectors on an equal footing with native clerks.

12.—*Administrative bodies.*—The reconstruction of the Lagos Municipal Board, which renders it a much more representative body than formerly, was announced on the 19th February, the composition being five official and five unofficial members, presided over by the Administrator of the Colony.

With the exception of the Itu Board of Health, which is now defunct, the station being of little political significance and no Government Medical Officer being resident there, the Boards of Health, constituted under the European Reservations Ordinance, 1912, are still performing their function.

13.—*Sanitary jurisdiction over new territory.*—The most important factor affecting the sanitary administration of the Southern Provinces was the announcement by the Governor-General on the 16th of September of the "Abrogation of the Treaty of Egbaland."

This extensive territory, over which we had previously no sanitary jurisdiction, now forms part of the Southern Provinces of Nigeria, and great hopes are entertained regarding its future sanitary development.

Whereas in the past Abeokuta, the seat of the Egba Government and the largest and most important town in the Egba country, situated only about sixty miles by rail from Lagos, was the source of many epidemics and was regarded as a most insanitary town and a grave source of danger to the surrounding country, it will soon, we believe, undergo a wonderful transformation. I need hardly point out again that it was from this town that Lagos obtained its first authentic case of yellow fever in the epidemic of 1913.

14.—*Sanitary position of the Colony.*—Taking a broad survey of the whole sanitary position of the Colony, I do not think it would be untrue to state that, with our Sanitary Staff and equipment, which are being increased year by year, we maintain the position of being able to combat any epidemic likely to manifest itself in our midst.

15.—*Places visited.*—Only a very few places were visited last year, the more important being Bonny, Opobo, Degema, Brass, Akassa, Forcados, Onitsha, Asaba and Badagry.

Particular notice was taken of any recommendations carried out since previous visits were made and suggestions were put forward for future improvement.

16.—*Constructive work.*—Outside the Lagos Municipal Area and partly inside it we are entirely dependent on the Public Works Department for carrying out proposals involving constructive work.

In the Lagos Municipal Sanitary District the work was carried out mostly by the Lagos Municipal Engineering Department, but also by the Public Works Department.

The Railway Engineering Department is entirely self-contained and carries out its own approved sanitary engineering plans and the recommendations proposed by us.

(II.)—PREVENTIVE MEASURES AGAINST—

(1)—INSECT-BORNE DISEASES.

(A)—MALARIA.

17.—*Mosquito brigades*.—Strictly speaking, we have not in any town except Lagos a gang or gangs of men specially and exclusively employed for the destruction of mosquitoes, yet our sanitary inspectors and bands of labourers are so trained that they are required to devote the greater part of their time and attention to this, the most important part of their duty, and every hut, house and compound visited is carefully inspected with the primary object of discovering whether mosquito-breeding is taking place to any extent whatever.

Results of all observations are systematically recorded and later are entered in a book kept for the purpose in each medical office.

18.—*Complete weekly inspection*.—As the number of Sanitary Inspectors and labourers, who always act with them, allotted to the various towns, is sufficient to ensure a weekly or bi-weekly inspection of all huts and houses therein, together with empty plots, streets, drains and open spaces, it might be assumed that mosquito-breeding would soon be abolished; but such is not the case. The human factor with its grave imperfections has to be considered, and apart from this it not unfrequently happens that where proper water supplies are not established, and in some places where they are, the natives will fill their water-pots from the nearest available pool or water-hole, and when, on inspection, larvæ are found in the receptacles, they have no hesitation whatever in saying that the “wrigglers” were brought from the place where the water was obtained, and this unfortunately is often true.

19.—*Provision of mosquito breeding places*.—Sometimes, indeed, even where a stream exists, the native will dig holes close to the watercourse for the purpose of obtaining mud for building or repairing his hut, and very often such mud-holes, which may be hidden among long grass, escape the notice of the Sanitary Inspector, and it is only when he is made aware of their existence through the discovery of larvæ carried from them that he is impelled to take action and have the ground cleared and the pits filled up or kerosened.

That these water-holes do not always contain anopheles larvæ is quite patent to all, but many of them do, especially where the water is clean and nicely shaded, and one not uncommonly has found the surface of the water literally black with larvæ. I need not say that conditions such as these, when discovered, are promptly dealt with, but it would be well-nigh impossible, without the use of an enormously increased staff of inspectors and police, the upkeep of which would be prohibitive, to prevent the native, who instinctively appeals to nature under circumstances most advantageous to himself, from digging holes and obtaining mud for his dwelling or clay for the manufacture of pottery, one of the most important industries in the country, and so at the same time providing the requisite conditions for the propagation of his worst enemies.

20.—*Large earthenware pots as aids to mosquito-breeding*.—In this connection it is necessary to state that some of the earthenware pots provided are of such large dimensions that they cannot stand a great amount of handling, and, in order to obtain the necessary support to protect them from destruction, they are inserted, from a few inches to almost their entire depth,

in holes in the ground, and are used for the storage of water or for dyeing and other purposes. These form especial sources of danger unless frequently inspected, as they cannot be overturned when not in use, and they are very troublesome to empty and clean. The native is always prone to leave some water behind which may contain mosquito larvæ or eggs, and it is impossible to get him to take the trouble to keep the pots covered when not in use.

Anopheles larvæ have occasionally been found in water-pots, large and small, and whether they were obtained from the source of water supply or developed entirely in the vessels it is not always easy to determine.

21.—*Mosquito-breeding in crab-holes.*—To carry out more completely the process of destruction of all larvæ a special effort was made at the beginning of 1914, when it occurred to me that the problem of mosquito-breeding in crab-holes must be seriously tackled, and through the Government providing funds seven extra Sanitary Inspectors and fifteen labourers were engaged—the former after a time being reduced to four and the latter increased to eighteen, as by doing so more work was accomplished—and placed under the direct supervision of Mr. C. Davies, European Sanitary Inspector, who had at the same time his other duties to perform.

The results obtained proved highly satisfactory, owing to the thoroughness with which Mr. Davies carried out his instructions and taught inspectors and labourers how to get about their work.

Various methods of treating crab-holes were tried, such as pouring into them a solution of a strong disinfectant, such as Cresol, Cyllin or Sanitas Okol, which immediately before being used was boiled. The holes were then filled up.

In practice this worked very well, but such large quantities of disinfectant were used and time wasted that, later, digging out the crabs was resorted to, and even better results were obtained, as this method appealed to the common sense of the native, who retained the larger crabs for his own use.

About 1,500 holes were dealt with monthly, and after the first treatment only about 30 per cent. were re-opened. On being re-treated the percentage was reduced to fifteen, and later, in places, to practically nil. The larvæ found in the holes were mainly *Culex insignis*, *Culex decens*, *Culex tigripes* and *Ochlerotatus irritans* when the water was low, but when the surface level of ground water nearly reached the level of the ground, *Stegomyia fasciata* and even Anopheles larvæ were found.

22.—*Swamps, drainage and reclamation.*—Concurrently with the closing of crab-holes, the drainage of swamps and filling of pools and puddles were carried on by the same inspectors and gangs of labourers.

Many swamps are so low and extensive that they cannot be effectively drained, but most of them are stocked with small fish which aid greatly in the reduction of mosquito larvæ.

When a swamp is small there is no difficulty in dealing with it either by filling it up or by using kerosene, or sometimes by draining; but the last is exceptional and there are very few small swamps, so we are compelled to fall back upon reclamation by clean sand and subsequent drainage as the only sure preventive of mosquito-breeding.

23.—*Tidal ditches and swamp.*—In some places, such as Forcados, a very large area of land is flooded at high tide, but so many wide channels have been cut that as the tide ebbs the water rushes down them to the river, and what was once swamp becomes apparently dry land. Few larvæ of

any kind can be found anywhere around the edges of this swamp—little fishes are so abundant—except during the dry season, when they have been discovered in large holes which at certain states of the tide are only just connected with the general swamp.

24.—*Reclamation and drainage in 1914.*—Reclamation work was carried out at the Customs and at Alakoro in Lagos; reclamation and drainage were done in Forcados and Burutu, and drainage alone at Calabar, several thousands of pounds being spent on the whole works.

25.—*Cleaning and clearing of watercourses.*—Watercourses were cleaned and the banks cleared, but not as frequently nor to such a great extent as was considered desirable. In the dry season many streams become merely a succession of water-holes which form admirable breeding places for mosquitoes.

26.—*Wells, tanks and barrels.*—Most wells in existence are shallow and few are effectually covered or gauze protected, so that mosquito-breeding is sometimes found to go on in them and, for such, one or other of the following three remedies must be adopted, viz., complete mosquito protection, filling up, or kerosening.

Privately owned tanks received a good deal of attention during inspections, the result being that many had to be completely mosquito-proofed or repaired.

In Bonny, Forcados and Lagos the mosquito-proofing of barrels becomes more popular day by day, and during the year in Lagos 361, and in Forcados 213, were protected. Government tanks are being constantly kept in a mosquito-proof condition.

For the benefit of the public such work as is required on barrels or tanks is done in Lagos by the municipal carpenter and at the other places by the Public Works Department, the price charged being in each case practically only the original cost of the material used.

The latest type of barrel, the "Forcados," when properly finished has no place where even a few drops of water can collect, and it is a great improvement on those first made.

There is a strong wooden top, fitting closely to the sides of the barrel, and having its upper surface flush with the rim. This has a central opening about eight inches square, into which fits a wooden frame with gauze nailed on the under surface, the edges of the frame being rabbetted so that it will not drop inside the barrel. Over this frame and resting on the top of the barrel fits a dust-proof wooden cover.

A one-inch hole, to act as an overflow, is made in the side of the barrel just under the wooden top, and is covered with a small piece of gauze.

A strong wooden tap is fitted, the whole cost, not including the barrel, being 1s. 6d., the same as in 1913.

27.—*Larvicides used.*—For general purposes the larvicides used were Kerol, Carbolacene, Cyllin, Sanitas Okol, Cresol, kerosene, crude petroleum and coal tar, which mixes readily with kerosene and ensures the latter being used for the purpose for which it was originally intended.

28.—*Lagos Water Supply and prevention of mosquito-breeding.*—The water supply for the Lagos Sanitary District was not officially turned on at the end of the year, so no steps could be taken to close the wells or remove

tanks and sagging eaves-gutters, but where the last-named were provided for outhouses in Government compounds and were obviously unnecessary they were taken down.

29.—*Mosquito Index*.—The mosquito index for the more important towns generally shows a fall on the previous year's record, but where a rise appears it does not always follow that there has been a corresponding increase in the rainfall, and that is what one would naturally expect to find.

In some instances the rise is due to increased diligence and attention to duty on the part of the inspectors, in others it seems to vary with the rainfall.

30.—*Possibility of reaching a constant index*.—Taking all human imperfections into account and all elemental variations it does seem possible that, with a properly organised staff carrying out the work, a time will come when the minimum index of expectation will be reached, that is, a practically constant figure or percentage for each town, which should show but slight variation from week to week and from year to year.

In small outstations few mosquitoes are found, but the index given is usually computed from figures obtained from the surrounding native towns.

31.—*Anti-mosquito return*.—The attached return of anti-mosquito work for 1914 gives a comparatively good idea of the weekly index, the maximum records being reached during the rainy season.

It is gratifying to know that the figures for the ports of Lagos, Forcados, Calabar and Bonny are being gradually reduced.

The places presenting very high indices, such as Oshogbo and Awka, had no resident Medical Officer; Afikpo and Itu were mostly dependent on their Sanitary Inspectors, and Ibadan II had no trained inspector at all. There were 8,439 notices issued against mosquito-breeding, and 3,101 persons were prosecuted.

32.—*Mosquito protection of houses and use of mosquito-nets*.—The mosquito-proofing of houses is being constantly carried out, and is appreciated almost as much for the protection it gives from all kinds of flying insects as from mosquitoes.

In some places the life of the gauze is much shorter than in others, and the expense involved in keeping a large number of bungalows continually in an efficient state of protection would be very great, but most of them are only partially mosquito-proofed.

Europeans generally find protection of one or more rooms by wire gauze is more satisfactory than the use of mosquito-nets or even mosquito-cages, but in the bush the latter are very valuable and highly appreciated.

When travelling, mosquito-nets or portable mosquito-rooms are always in use.

It is wonderful how soon the native discovers the value of a European device and adopts it, but not always for the particular reason that it was invented; and so he is gradually becoming accustomed to sleeping under a cotton gauze net, more for the immediate comfort it affords against annoyance from biting flies and other insects than as a means of protecting him against a possible attack of fever.

33.—*Distribution of quinine*.—There was a great increase in the amount of quinine issued free last year. This was brought about by its more general use in schools and prisons. A weekly dose of three grains was

given to each child if the principal of the school desired it, and a dose of five to ten grains was supplied to each prisoner, more especially in out-stations.

Most Europeans take five grains of quinine daily, and a large number of natives, especially Government employés, take intermittent doses of five grains.

34.—*General anti-mosquito work.*—In discussing this subject one is rather liable to traverse the ground occupied by other mosquito-borne diseases, but all are so immediately linked together and preventive measures against them so exclusively based on the work done by Sir Ronald Ross that they assume a like importance, and the methods of dealing with the one are entirely applicable to the other; hence discrimination between the various protective measures, which would not appeal to the native and would be unproductive of useful results, could only lead to utter failure in the attempt to obtain our object, namely, the eradication of all mosquito-borne diseases; and in any case the heading “Malaria” will ever remain the most appropriate under which to discuss general anti-mosquito work.

(B)—BLACKWATER FEVER.

35.—*Decline in number of cases and its cause.*—Whatever the cause of the steady decline in the number of blackwater fever cases with its heavy case mortality (25 per cent. in Europeans and 50 per cent. in natives in 1914), it is very gratifying to record that, like malaria, rapid progress is being made in its reduction.

There can be little doubt that the dissemination of useful information to the layman as to how he should live on the Coast, the more regular use of quinine, and the general improvement in the sanitary condition of stations have largely contributed to the decline.

(C)—YELLOW FEVER.

36.—*A continuation of the 1913 epidemic.*—Throughout the year cases of yellow fever continued to make their appearance, but their distribution was so wide and their appearance so irregular and disconnected that one would hardly be justified in designating the outbreak as an epidemic. It seemed rather—and it must have been connected in some way with the epidemic of 1913, as some of the cases occurred in places known to be previously infected—that it formed part and was a continuation of the outbreak described in last year's annual report.

Other cases appeared which were regarded as suspicious, the patients recovering rapidly.

37.—*Procedure adopted against spread of infection.*—In all cases when the disease manifested itself attention was directed to discovering its source, and strenuous efforts were put forth to prevent, if possible, further infection.

Almost exactly the same procedure was adopted as during the epidemic of 1913, the exception being that in Lagos evacuation of the infected area or ship was continued only for the period requisite to carry out complete disinfection, and all persons in it were kept under surveillance instead of being isolated at an observation camp. This change in procedure, which was really adopted towards the end of the 1913 epidemic and was brought about through the native discontent with compulsory removal, was found to work quite as well as isolation.

38.—*Reported cases.*—Of the cases reported, of which 50 per cent. proved fatal, six were from ships constantly calling at different ports and two occurred in persons living in the sanitary district of Lagos.

Shipping might account for fewer cases if the men aboard them adopted more precautions against being bitten by mosquitoes, but the stuffiness of cabins and the poor accommodation given to the crew generally tend to make them discard, as often as possible, the use of mosquito-nets even when they are provided with them.

39.—*Precautionary measures.*—It is unnecessary to relate again the precautions taken against spread of infection, but every effort was made to destroy infected mosquitoes and to suppress mosquito-breeding in all ports and places where *Stegomyia calopus* was known to exist. One new measure of practical importance made provision for the protection of houses unprovided with mosquito-rooms where yellow fever might occur in outstations. It was the supplying of sufficient cotton gauze and wire nails, in hermetically sealed tubes, to central depôts, so that, should a case of yellow fever occur, immediate steps could be taken to protect the patient's room and prevent mosquitoes biting him and further spreading the disease.

40.—*Summary of yellow fever events on the Coast.*—The following is a brief summary of events in connection with yellow fever on the Coast, inside and outside Nigeria, during 1914, the latter being given as reported to us:—

January	6th.	Case at Warri, Nigeria, <i>ex s.s.</i> "Arnfried."
January	9th.	Case at Oguta, Nigeria, <i>ex s.s.</i> "Brig."
January	15th.	Saltpond on the Gold Coast declared infected.
January	19th.	Case at Lome on the Gold Coast.
February	4th.	Saltpond quarantine raised.
February	12th.	Case on board <i>s.s.</i> "Porto-Novo" at Iddo in the Lagos sanitary district.
February	15th.	Case on premises of Messrs. Witt & Busch, Lagos.
February	16th.	Lagos in quarantine.
March	1st.	Case at Accra, Gold Coast.
March	4th.	Lagos quarantine raised.
March	8th.	Case at Ebute-Metta, in the Lagos sanitary district.
March	13th.	Case at Boia, Sierra Leone.
March	26th.	Case at Burutu, Nigeria, <i>ex s.s.</i> "Nembe."
April	3rd.	Case at Quittah, Gold Coast.
April	25th.	Case at Calabar, <i>ex s.s.</i> "Yola."
May	6th.	Case at Bole, Gold Coast.
May	9th.	Case at Ayinam, near Obuasi, Gold Coast.
May	24th.	Case at Quittah, Gold Coast.
May	31st.	Case at Saltpond, Gold Coast.
June	16th.	Case at Quittah, Gold Coast.
July	15th.	Case at Axim, Gold Coast.
August	15th.	Case at Somanya, Gold Coast.
August	24th.	Case at Tamale, Gold Coast.
October	24th.	Case at Forcados, <i>ex s.s.</i> "Ashanti."
December	3rd.	Two cases at Tamale, Gold Coast.

(D)—FILARIASIS.

41.—*Preventive measures.*—The only measures adopted against the spread of filariasis, which chiefly attacks the native, are those already described and practised against the spread of malaria.

The protection of patients suffering from the disease is most important, but only those coming for treatment can be prevented, for the time being, from

becoming a danger to their neighbours, and mosquito-nets are not in general use among the native population.

Wells, tanks and water supplies received a great deal of attention, but many wells were not provided with pumps. When pumps were provided, the native soon managed to render them unfit for further use.

(E)—TRYPANOSOMIASIS.

42.—*Prevention of tsetse breeding.*—Like the last named disease, trypanosomiasis has been chiefly confined to natives, and that to certain areas where tsetse flies are numerous.

The knowledge gained by the study of the haunts and habits of these flies, both in this country by officers of the West African Medical Staff and in East Africa by the Sleeping Sickness Commission, makes it plain to us that operations for the prevention of increase of the flies, to be of any practical value, must be carried out thoroughly and over a very extensive area. Hitherto the attention paid to tsetse haunts and the clearing of bush and banks of streams has been on such a small scale that no diminution can be noticed in the number of flies.

43.—*Segregation of patients.*—An attempt, as stated in previous reports, has been made at segregating a number of cases of sleeping sickness at Ikotobo Camp, in the Eket District, but it would be a difficult matter to collect all cases in this way.

Missionaries take a great interest in people suffering from trypanosomiasis, but they have no means, except through teaching the natives, of carrying out a campaign for the extermination of the fly. Many of them are of great service, however, from their long connection with the native, in discovering cases and persuading them to undergo treatment.

(2)—INFECTIOUS AND EPIDEMIC DISEASES.

(A)—CEREBRO-SPINAL MENINGITIS.

44.—*No case recorded.*—No case of this disease was recorded.

(B)—CHOLERA.

45.—*At present unknown in Nigeria.*—This disease is unknown in Nigeria, but should it be imported at any time there is ample opportunity, unless strict precautionary measures were adopted, for its being disseminated.

Water supplies are not altogether satisfactory except at a few places, but greater attention has been paid of late to this important subject.

Europeans and a very few natives use water which has been boiled, or boiled and filtered, or filtered and boiled.

(C)—DYSENTERY.

46.—*Causes of prevalence of dysentery.*—Dysentery is comparatively common, both among Europeans and natives, and in certain prisons it is liable to make its appearance. The strenuous life led by Europeans on the Coast leaves them little time to take a sufficient interest in their own personal welfare, and many matters requiring careful supervision are left to be carried out by native servants who, though efficient in many ways, do not thoroughly comprehend the necessity for complete cleanliness.

47.—*Native servants and filter cleaning.*—Sometimes servants are trusted entirely with the care of filters, and many of them are quite unscrupulous in the methods they adopt in producing the filtrate, hence contamination of the water occurs more frequently than is supposed.

48.—*Improperly washed vegetables.*—The practice of eating salads containing vegetables which either cannot be or are not sufficiently well washed, has also no doubt been responsible for several cases.

49.—*Apathy and unbelief of native.*—It is extremely difficult to get the native to believe that the disease is spread chiefly through the use of unclean food or impure water, and he will not, when thirsty, discriminate between clean and dirty water. His food, often well-cooked, is usually wrapped in soiled leaves, or served in dishes washed in polluted water.

50.—*Precautions used in prisons.*—When the disease occurs in prisons all infected persons are isolated, and the greatest care is taken with regard to water and food supplies, the disposal of dejecta, and the introduction of fresh cases from without. Strict cleanliness is observed both inside and outside the prison, and well-cooked food and boiled water are supplied to all prisoners wherever they may be working.

51.—*Recent measures adopted.*—Recently greater attention has been paid to the suppression of house-flies, and this, with better water supplies, improved sanitary conditions and stricter personal attention to food and drink, may soon lead to marked reduction in the number of cases.

The death rate was 107·6 per 1,000 cases treated.

(D)—TYPHOID FEVER.

52.—*Rarity of enteric and preventive measures.*—This disease, though not unknown, is comparatively rare, and, like other water-borne diseases, shares in the general measures adopted for the protection of water supplies.

In the Southern Provinces and Colony of Nigeria only milk in tins is used, so that it is unlikely that infection could occur in this way.

It is probable that there are always a few carriers of the bacilli about, and if measures were adopted for the incineration of all faecal matter at stations inhabited by Europeans, not only enteric but many other infective diseases would be markedly reduced or rooted out, but such a proceeding would be costly.

(E)—PLAGUE.

53.—*Necessity for plague precautions.*—Next to yellow fever, the disease which concerned us most was plague, and although no case had been reported in the area over which we exercise control, there was always the possibility—so great is the amount of intercommunication between coast towns—of its being imported from one or other of the West African ports, where it had frequently assumed epidemic importance and been responsible for many deaths among the inhabitants.

This constant danger—necessitating extreme vigilance on our part and preparation for any eventualities—together with the existence of a severe epidemic at Dakar, were mainly responsible for the lively interest displayed last year in considering what action should be taken to prevent the introduction of the disease into Nigeria, and what measures should be adopted to effectively cope with an outbreak should one unfortunately occur.

54.—*Use of virus.*—Steps were immediately taken for the more complete reduction of rats, large quantities of Danysz Virus and other poisons being used with good results, and rat traps more extensively employed.

55.—*Rat guards.*—A specimen rat guard of the most approved type, with a disc diameter of 3 ft., was made by the Public Works Department, but owing to the difficulty of obtaining the proper material for their construction, it was considered advisable to have a number of them made in England.

56.—*Introduction by man.*—The fact was not lost sight of that there was more likelihood of the disease being introduced by the native himself than by rats, and while traffic was allowed to proceed in its ordinary course, due precautions were taken to avert, if possible, the introduction of the disease by man.

57.—*Traps.*—Traps were distributed to all ports, and a keen interest was taken by Medical Officers in rat reduction in ships and in houses.

Instructions were issued that all Government vessels and other floating craft should be disinfected at regular intervals, when possible, and the Clayton machines or sulphur pans were employed in some places where trapping was considered to be ineffectual.

58.—*Plague prophylactic and anti-plague serum.*—Quantities of plague prophylactic and anti-plague serum, together with the necessary syringes and platinum-iridium needles were obtained from England, and the former were kept in a cool chamber at the cold storage for any emergency.

59.—*Use of poison not advisable where there are children.*—It was not considered advisable to use powerful rat poisons in houses where there were children, as the latter might readily be poisoned, but in such cases traps were freely used, a considerable addition being made to those which were already in use along the front of the town, especially to that area confined to shipping, in which large warehouses are erected and large quantities of food-stuffs stored up without being protected by wire netting against the access of rats.

Two kinds of traps were employed, *viz.*, the break-back and the cage varieties, the latter being considered the more useful.

To make the trapping of rats more effective, Oil of Anise was used by those handling the traps, and a large quantity of this useful article was purchased.

60.—*Forwarding rats for inspection.*—An arrangement was made with the Municipal Sanitary Officer to send, if possible, two dozen live rats to the Director of the Medical Research Institute on every working day for the latter's inspection and report.

61.—*Census of food sellers.*—Later, to facilitate the correct disposal of rat traps in Lagos, a census of all agidi and other food sellers was taken, their correct names and addresses being noted by the Sanitary Inspectors.

62.—*Measures adopted same as in 1908.*—It may be here stated that practically the same procedure was adopted last year as in 1908, when plague appeared at Accra, and Professor Simpson advocated measures for the prevention of introduction and the suppression of the disease and for the destruction of rats, fleas and other vermin.

Dead rats and mice which were collected were brought to the Health Office and inspected before being immersed in disinfectant solution, after which they were removed to a kiln to be destroyed.

Rats which were caught alive in cage traps were killed *in situ* and dropped into a solution of disinfectant, the fleas being collected and counted to discover, if possible, the periods of their propagation.

Various pulicides have from time to time been in use.

Inspectors and labourers received instructions to discover rats' nests, but they have not been very successful in this direction.

63.—*Use of cats and dogs.*—A very large number of Yoruba natives breed cats solely for their own consumption, and although the animals are seldom permitted to outlive the kitten stage it is reasonable to assume that they play some part in keeping down the number of rats.

Dogs are also much in evidence, and, being great hunters, no doubt render useful service in the reduction of rats.

64.—*Rat catching by natives.*—The natives themselves have a large number of serviceable traps in use, but there are no professional rat-catchers among them. Their sole justification for making war on rats is that the latter are found to be uneatable, and they destroy considerable quantities of food supplies.

The uselessness and destructiveness of these vermin appeal so forcibly to the native that he, at any rate in this part of the country, required no monetary inducement to destroy them.

65.—*Rats on ships.*—In addition to the measures enumerated above, due notice was taken of any increase in the number of living or dead rats aboard ships, and it was arranged to have the latter sent to the Research Institute for identification and examination.

A three-monthly disinfection of all ships was advocated, but under the circumstances this was found to be impracticable.

66.—*Rat-proof buildings.*—Most Government buildings can be regarded as practically rat-proof, but I have heard of rats finding their way into houses through open windows by climbing up creepers trained against the walls. There is always a staircase by which they can ascend, but there is little chance of their finding a permanent lodgment in such dwellings. Of course, it is quite possible for them to burrow under buildings, even though the site area may be covered by a thick layer of concrete, as it is believed that unless foundations extend to a depth of at least two feet, burrowing cannot be prevented.

67.—*Native huts or houses.*—Native rat-proof houses are comparatively scarce, and, indeed, the ordinary mat-roofed mud huts, combined with the natural tendency of most natives to store up large quantities of useless furnishings and food-stuffs, are rather encouraging to rats, which can at any time find among them a safe retreat.

68.—*Rat destruction in Lagos.*—In Lagos town the number of rats and mice caught by traps during the last three years, and afterwards cremated, was as follows:—

				Rats.		Mice.
1912	...	...	...	18,528	...	8,346
1913	...	...	...	16,488	...	8,279
1914	...	...	...	13,352	...	6,817

It will be noted that there has been a diminution in the number of rats caught each year, and although special efforts were put forth last year, the decrease became more marked. This may have been due to the extent to

which rat poisons were used, as it has been noticed that under such circumstances rats disappear completely, as a rule, in about four or five days after the virus has been laid down, and are not seen again for two or three months, after which they rapidly increase in number.

69.—*Effect of Danysz Virus.*—The effect of Danysz Virus is not always the same, some consignments being more potent than others, but, on the whole, it acts well, and its virulence might be increased by local intensification.

Seldom are dead rats to be seen after the action of the virus, and in a few instances where the poison did not act well, some rats were seen to go about in a dazed condition.

70.—*Live rats.*—The number of rats caught alive is small, so we have not resorted to destroying the females and allowing the males to go, which practice has been found useful in diminishing the number of rats in some other places.

71.—*Use of poisonous gases other than sulphur dioxide.*—The use of carbon bisulphide or hydrocyanic acid gas has not been attempted.

72.—*Results obtained.*—How far our efforts have proved effectual either in destroying the means of spreading plague or preventing its introduction into our ports is not known, and while Nigeria may possess a certain immunity from plague and, so far, has been free from the disease, we are ever watchful lest by any chance it should escape our vigilance and gain a footing on virgin soil, whereon the means for promoting its propagation have been clearly demonstrated to exist.

73.—*Further protection against plague.*—A matter which would greatly conduce to the protection of a port against plague, but which has not as yet received attention, would be prohibition of erection of other than rat-proof houses, stores and warehouses within a distance of 250 or 300 yards from the water front in the vicinity of wharves or landing places.

(F)—SMALL-POX.

74.—*Decline of variola epidemics.*—Small-pox, like many other diseases known in this country, does not seem to produce such ravages among the people as it did some years ago, and is no doubt being partially prevented from doing so by the general but very gradual improvement in sanitation throughout the land.

75.—*Enemy to progress.*—The chief enemy to the suppression of the disease has always been the small-pox juju priest, who is well versed in the nature of variola and the means by which it can be spread; but the energetic action adopted by the Government during the appearance of an epidemic is gradually ridding the country of these enemies to progress.

76.—*Provision made for dealing with epidemics.*—Epidemics now rarely occur—last year only one was reported and was soon suppressed—and when they do, we have generally all the means at our disposal for dealing with them after their cause has been ascertained.

77.—*Occurrence of small-pox and method of dealing with it.*—A large number of natives try to conceal small-pox cases or send them away to farms, but when one does become known to a Sanitary Inspector it is immediately reported to the Health Officer, who takes the necessary steps for the isolation of the patient, the disinfection of the house and its contents and the vaccination of all persons in the surrounding houses and any others who may have visited the patient. The sanitary condition of the house and its surroundings comes

in for a good share of attention, and in every case a general cleaning up takes place, the house or hut in which the disease appeared being lime washed.

The death rate was 136·3 per 1,000 cases treated last year.

78.—*Vaccination compulsory*.—Vaccination is compulsory in the Colony and Southern Provinces of Nigeria, and a large staff of special vaccinators is employed, who act under the instructions of the Medical Officers of Districts. The Sanitary Inspectors are also competent vaccinators.

All persons under the age of twelve years must be vaccinated or have had small-pox, and all such persons are exempt from re-vaccination until they have attained that age.

Employers of immigrant labour are required to notify the Health Officer within three days of the arrival of such labourers, for the purpose of their inspection and vaccination.

Penalties are provided for persons having small-pox exposing themselves on the streets, for concealment of the disease and for wilfully conveying infection.

79.—*Lymph in use*.—Large quantities of lanolinated lymph are constantly arriving at various centres throughout the Colony which are regularly distributed to the Medical Officers.

80.—*Results of vaccination*.—Vaccination has undoubtedly produced such beneficial results through the energetic action of the Medical Staff that the country can congratulate itself in being so free from epidemics of this disease, yet many natives are still averse from it, and prefer running away to submitting themselves for treatment.

		1913.		1914.
Total number vaccinated	... ..	168,941	...	149,273
„ „ successful	... ..	121,102	...	99,260

(G)—VARICELLA.

81.—*Precautions as in variola*.—Varicella is very prevalent among the native community, both adults and children suffering from it. It also appears frequently in our prisons, but occasions little cause for anxiety.

The cases are isolated, and practically the same precautions are adopted in this disease as in variola.

The death rate among cases treated last year was 12·3 per 1,000.

(H)—VENEREAL DISEASE.

82.—*Not notifiable*.—Venereal disease is very common and is difficult to suppress, as many cases never come under observation.

No special sanitary precautions are taken against the disease, which is not notifiable. No deaths were recorded among natives.

(J)—TUBERCULOUS DISEASE.

83.—*Aids to increase of tuberculosis*.—Tuberculosis is also not notifiable. The insanitary conditions under which most natives live, their inherent love of small, stuffy rooms, and their disregard for the rudiments of sanitation with respect to the food they eat and the water they drink, are important factors in predisposing them to tuberculous disease.

84.—*Preventive measures advocated.*—The only measures which we have been able to advocate are the construction of model dwellings, improvements in water supply, drainage and sewage disposal, destruction of refuse, and proper town planning, with the adoption of wide streets and large open spaces.

The death rate from this disease among cases treated last year was 211·9 per 1,000.

(K)—PNEUMONIA.

85.—*Pneumonia and its prevention.*—Pneumonia is another disease which causes a large increase in the native death rate.

The same conditions of life as described under tuberculous disease are also the important factors in predisposing the natives to attacks of pneumonia.

The mortality per 1,000 cases treated was 147. General improvement of the conditions under which the natives live is the only measure that has been adopted.

(L)—RHEUMATIC FEVER.

86.—*Predisposed to insanitary conditions.*—This is another disease predisposed to by general insanitary conditions under which natives live, but the death rate, although the disease is fairly common, is not large.

(M)—LEPROSY.

87.—*Isolation or segregation of lepers.*—Apart from the isolation of a number of lepers in Government and Mission Asylums to which farms are attached, no special measures have been practised.

The idea of establishing segregation centres near the places from which cases are derived, and making the chiefs and people responsible for the upkeep of such establishments, is gaining ground, and is probably the wisest solution of the leper problem.

(3)—HELMINTHIC DISEASES.

(A)—ANKYLOSTOMIASIS.

88.—*Experimental work.*—General interest was manifested in the dissemination of this disease, and useful work was done to discover the methods by which it could be combated, Dr. Adam, Senior Medical Officer, and others spending most of the time they could spare experimenting and making improvements to try to obtain a substantial reduction in the number of cases in the districts to which they were posted.

89.—*Prevalence of the infection and the production of anæmia.*—In some places it is considered that at least 30 per cent. of the population harbour ankylostomes, but as severe symptoms or serious disability do not always manifest themselves the people do not as a rule ask for treatment.

It is generally believed that a large number of the cases of anæmia in the country are brought on by these parasites.

90.—*Infected prisoners and precautions in prisons.*—Many prisoners are infected with ankylostomes, and Medical Officers sometimes make a practice of examining the stools of all prisoners on the first day of their incarceration.

As a precautionary measure, prisoners on returning from work must wash their hands in antiseptic lotion.

The cells are cleaned every day and sprayed with cyllin or other antiseptic.

91.—*Disinfection of stools and care of latrines.*—In all cases in which ova or embryos have been found, careful attention is paid to the disinfection of stools, after which they may be incinerated or placed in trenches which are not too shallow. The same measures are adopted with regard to hospital cases.

Patients are not permitted to use the same latrines as those not so affected, and the utmost care is taken to ensure the ground not being soiled.

92.—*Water supply and latrines.*—Much attention is given to water supply and latrine accommodation in places where the disease is very prevalent.

93.—*Treatment.*—The daily treatment by Thymol is practised in the prisons, but, as far as I am aware, the “intensive” method has not been introduced.

The number of deaths which occurred in cases coming under observation was 27·1 per thousand.

(B)—BILHARZIA.

94.—*Prevention.*—To prevent this disease from spreading, measures which have been taken to protect water supplies from surface drainage, the provision of ample latrine accommodation, and instructing people to boil all water used for drinking purposes, should go a long way in reducing or at least in keeping down the number of cases, which was very low last year.

(C)—GUINEA-WORM.

95.—*Relation to water supply.*—Guinea-worm is more prevalent in places where the water supply is unprotected, that is, where it is under native control, than it is elsewhere. In Abeokuta, after the introduction of the new water supply it was noticed that a marked reduction took place in the number of guinea-worm cases presenting themselves for treatment, but sufficient time had not elapsed, since the opening of the new supply, to warrant an accurate conclusion as to the cause of this reduction being arrived at.

96.—*Prevention of guinea-worm.*—In Lagos several wells were treated by steam in the manner suggested by Dr. Leiper, and no living *Cyclops* were found after the experiments were performed, but this practice could not be universally employed. The addition of a little potash to the water would, besides killing the *Cyclops*, have the effect of preventing the native from using an infected well, even though the quantity was so small that no difference in taste could be perceived; this method has not been tried, in order not to incur the strong resentment of the native.

Where water supplies have been improved guinea-worm is not common, although it may be prevalent in the surrounding districts.

(D)—TÆNIASIS.

97.—*Prevention of tæniasis.*—In the prevention of tæniasis it is hoped that practical demonstrations given in strict personal hygiene will have some effect. The general measures adopted with regard to the regular daily disposal of nightsoil, which are being gradually extended to the more important towns, will also prove to be of much value in diminishing the number of cases of tape-worm.

98.—*Keeping of oxen and pigs.*—Only in a few places are numbers of oxen and pigs kept, and in some large towns, such as Abeokuta, the keeping of pigs is prohibited, which may account for the comparatively small number of cases found among natives, who are not extremely fastidious regarding what they eat.

The disease is found chiefly among Hausa soldiers, and efforts have been put forth to get them to avoid eating meat which was not sufficiently cooked.

(E)—TRICHINOSIS.

99.—*No case reported.*—No case of trichinosis was reported during the year.

(F)—ASCARIS.

100.—*Native habits responsible for many cases of this and allied diseases.*—The native habit of defecating in any open space in and outside towns, where latrines and proper police supervision are not provided, is responsible for the very large number of people who harbour these worms. The provision of latrines or the digging of salgas has been recommended for every town, but even when these are constructed the insanitary habits of the native will always leave him open to infection by *Ascaris lumbricoides*.

The wholesale dosing of the population by santonin and the careful disposal of the faeces would be the only measures that could prove effectual in entirely destroying the parasites. No doubt this infection is also the cause of much anæmia in the country, which makes the patient more susceptible to other diseases.

(III.)—GENERAL MEASURES.

CLEARANCE OF BUSH, UNDERGROWTH, &c.

101.—*Attention paid to bush clearing.*—In all Government Stations the clearance of bush and undergrowth is a matter of primary importance, and much time and labour are spent to keep them under proper control. In the smaller stations all clearing is done by prison labour, while in the more important places large gangs of labourers are employed. Augmentation of labour in out-stations is easily obtained, owing to the cordial relations existing between the Political Officers and the people, who are often very glad to work on the stations when not employed on their farms. Many thousands of acres of Government and native land are cleared of which no record is kept, and it would be impossible to make even an approximate guess at the amount of work done in any one year.

102.—*Clearing by natives.*—The native habit during the dry season of setting fire to bush and long grass is a very effective means of destroying, for a season, most of the undergrowth, which permits him to plant yams, cassava, cocoa or whatever he may desire; but when the rainy season sets in, unless the bush has been uprooted, the whole area becomes overgrown again.

DISPOSAL OF REFUSE.

103.—*Evolution of the dustbin.*—The gradual evolution of the dustbin from a simple oblong wooden box through various complex designs of wood, or wood and iron, to the type adopted in 1908, which is the pattern in favour at the present time, has been a very slow process.

Many towns are now completely or partially provided with this type, which has a concrete floor, brick walls and a corrugated iron roof supported on wooden posts set in the walls. There is a door through which the labourers can enter to remove the refuse, and which prevents the access of goats to the interior of the structure.

A concrete platform is constructed round the bin to facilitate clearing up of the surroundings, and steps are provided on either side so that a very small child can empty refuse inside the bins, which are placed in conspicuous and suitable positions.

Previous to the adoption of this type, refuse was as frequently placed outside as inside the receptacle.

104.—*Refuse burned, buried or thrown into the stream.*—From the dustbins the refuse is taken to an incinerator, canoe or boat, or to a trench in open baskets (not a satisfactory method), or in carts, the body of the latter being generally constructed of thin sheet iron and supported on two wheels. These carts are constructed to be drawn by man power.

105.—*Incinerators.*—The use of incinerators is costly on account of the low calorific value of tropical refuse and the amount of fuel it is necessary to use to carry out even partial combustion of the material.

The number of incinerators varies with the requirements of a station, and the type is not the same at all places; the closed conical design, built of brick with a fireclay lining inside, and having a tall metal chimney, is the pattern that has been found most suitable in this country, where there is an abundant downpour of rain.

Drying sheds are, as a rule, not in evidence, and by far the larger number of incinerators in use are of the open oblong type which, in the dry season, work fairly satisfactorily; but it is almost impossible to prevent nuisances arising from smoke, unburnt material and fly-breeding.

106.—*Daily removal of refuse.*—Daily removal of refuse is carried out owing to the rapidity with which decomposition of the organic matter sets in, and this system obviates the possibility of offensive nuisances arising.

107.—*Reclamation by refuse.*—Much useful work is done, especially in swamp areas, by reclamation with the incombustible substances and the fixed and harmless products of combustion.

108.—*Dumping into rivers.*—From towns situated on the banks of a river or on the coast, the refuse is usually taken out in a canoe or sanitary barge or boat and dumped into the water.

109.—*Refuse from streets, &c.*—Refuse from streets and open spaces is dealt with in the manner described above for refuse from houses and compounds.

110.—*Burial of refuse.*—Burial of refuse in trenches or pits is carried out in stations where no incinerator has been erected.

DRAINAGE.

(A)—SUBSOIL.

111.—*Not much practised.*—Subsoil drainage is not practised to any extent, useful though it has proved to be in the few places where it has been carried out, and we are convinced that with an extension of subsoil drainage

a great deal of mosquito-breeding would be prevented and a large saving would accrue from the fact that much less disinfectant and kerosene would require to be used.

(B)—SURFACE.

112.—*Largely carried out.*—Surface drainage is largely carried out, but only in a very few places has there been anything approaching a complete or satisfactory system attempted.

The absence of town planning, and the natural tendency of the natives to erect huts or houses on any convenient site just clear of natural water courses, make the adoption of an effective drainage scheme a matter of some difficulty in most places.

113.—*Lagos drainage scheme.*—Lagos is the only town that can boast of a really sound and practical system of drainage of surface water and liquid refuse from compounds, but it is very incomplete, and only four miles of a required total of eighty miles, as calculated by Mr. Wright, Municipal Engineer, have been laid down.

Since 1910, 22,500 lineal feet of the Simpson type of drain have been constructed, and of this, 2,500 ft. were made during 1914.

Altogether Lagos possesses 18 miles of drains, 14 of which are of the dish-shaped pattern, and of this type, which is mainly built for the carriage of flood water from low lying areas, 1,900 lineal feet, with an average width of 3 ft. 6 ins., were built.

114.—*Type of drain usually constructed.*—Outside Lagos the dish-shaped type is the one generally adhered to, and in the dry season, when evaporation rapidly takes place, the result is the setting-up of a disagreeable odour.

As a temporary measure, for the drainage of pools and swamps where they cannot at once be filled up, the digging of ditches produces the necessary result.

REGULATION OF BUILDINGS.

115.—*Regulations in Lagos and Calabar.*—There are no regulations applicable to buildings outside of Lagos and Calabar, and no model huts or houses for the guidance of natives are in existence. In Lagos steady improvement goes on, but streets require to be straightened and widened, and but little has been done in that direction.

The Calabar regulations are not of such a nature as to make any material difference in the setting-up of buildings, but they are under revision, and when finally adopted should help to improve the town.

Sixty-six plans were approved by the Sanitary Branch for Government buildings, and the building of 344 structures was sanctioned by the Municipal Board in Lagos.

SANITARY INSPECTIONS AND PROSECUTIONS.

116.—*All houses and compounds inspected once a week.*—In Part (II.) (1) (A) of this report, on the prevention of malaria, I have stated that sanitary inspections are so arranged that every house and compound, in a town provided with inspectors, are visited at least once a week.

The number of inspections recorded in 1914 was 1,122,109, but the number of prosecutions is not reliable except under the Destruction of

Mosquitoes Ordinance and for nuisances in Lagos, and the former has already been given under "Malaria."

117.—*Prosecutions*.—Except in places where a special mosquito gang is employed, Sanitary Inspectors, in their daily visits, take note of all nuisances, and prosecutions generally follow after notices intimating the existence and for the removal of nuisances have been served.

118.—*Food inspection*.—Sheep and cattle, meat and meat markets are carefully inspected, and in important towns special inspectors are appointed for this work, but little attention is paid to general foodstuffs.

SEWAGE DISPOSAL.

119.—*Almost the same as in 1913*.—With regard to the disposal of sewage very little advance was made in 1914, the methods in use in the previous year being still applicable.

Several latrines were constructed over water and on land.

120.—*Conservancy in Lagos*.—The conservancy or pail system, at present in use in Lagos, is carried out in an area of 117 acres, but no increase of this took place last year.

121.—*Dumping of nightsoil into rivers or lagoons*.—Wherever possible nightsoil is taken out in sanitary pails by canoe and dumped into rivers or lagoons.

122.—*Shallow trenches*.—The shallow trench system of disposal is adopted in most out-stations.

123.—*Salgas*.—In Ibadan native town and a few small native reservations salgas are dug, new ones being constructed as required, usually by the inhabitants themselves acting under the supervision of specially trained men. Arrangements were made last year for the introduction of this system into Oshogbo native town.

124.—*Septic tank installation*.—Government Hill, Abeokuta, is the only place where a separate septic tank installation has been adopted.

125.—*Use of sanitary pails*.—Very gradually the extension of the use of sanitary pails with stench-proof covers is being carried out, and many stations are partly supplied with them.

126.—*Latrine cleaning*.—Regular cleansing and periodical tarring and lime washing of latrines were carried out.

TOWN PLANNING.

127.—*A new era in town planning*.—The preparation of plans for the lay-out of Port Harcourt European and native towns, early in the year, marked the beginning of a new era in town planning.

128.—*Schemes for existing towns*.—The adoption of town-planning schemes for old-established places, with irregular streets and an abundance of small lanes confining compounds and houses to the smallest possible dimensions, must absorb a tremendous amount of money, yet in important coast towns and many others it is the only sound plan to follow.

129.—*Rules for lay-out of new stations*.—Rules have been drawn up for the lay-out of new stations and native villages.

WATER SUPPLY.

130.—*Pipe-borne supplies.*—Lagos, Calabar, Benin-City, Ibadan, Abeokuta and Oshogbo are the only places which enjoy, partly or wholly, the benefits of a pipe-borne water supply.

131.—*Water supply in relation to sites for stations.*—In the selection of sites for new stations due attention is given to all the factors which should govern our choice, but chief among them is the necessity for having a good, pure, easily protected water supply, and a search is made to discover all possible sources.

132.—*Supply from springs.*—In many out-stations water is obtained from springs, and the utmost care is generally taken to protect it from any contamination by man or other animals or surface drainage.

133.—*Wells and tanks.*—The majority of places obtain their supplies from wells and tanks, and all the former are shallow and require periodical deepening.

Most public wells have been built of concrete rings, and but few are provided with pumps.

A large number of native wells are sunk through clay, and have only a concrete parapet and platform all round.

134.—*Abeokuta water supply.*—The pipe-borne water supply at Abeokuta has not yet been extended to all parts of the town, but so highly is it appreciated by the native that he will travel one or two miles to obtain it.

RAILWAY SANITATION.

135.—*Improvement in railway sanitation.*—The management of the Railway always take the keenest interest in any recommendations put forward to improve the sanitary condition of the stations and railway land along the line, the result being that there is continually going on a slow but certain improvement.

136.—*Sanitary Committees.*—The formation of a sanitary committee at the Railway Headquarters, Ebute-Metta, and sub-committees at important centres like Ibadan and Aro, where monthly meetings are held for the consideration of all matters affecting the sanitation of the particular section of the line allotted to them, has contributed in no small degree to the successful accomplishment of many useful reforms.

137.—*Responsibility of station masters and inspectors.*—To ensure the proper cleanliness of stations it was found necessary to make the station master, who is provided with the necessary labour, responsible for the sanitary condition of his station and the railway land surrounding it, and since this was done much improvement has resulted.

138.—*Housing of staff.*—Travelling Sanitary Inspectors are required to visit all stations and report regularly on their condition to the Health Officer.

The housing of the railway staff, both European and native, is conducted on satisfactory lines, and a more or less effectual attempt is always made at segregation of Europeans.

139.—*Port Harcourt*.—The important town-planning scheme being carried out in connection with the construction of Port Harcourt is a long way in advance of anything that has ever before been undertaken in the Colony or Southern Provinces of Nigeria, and it is not only there but along the entire Eastern Railway that due regard is given to present requirements and future development of stations.

140.—*Borrow pits*.—In the construction of a railway through low-lying territory it is inevitable that, to save expense in transport of material, borrow pits should be made which, if they cannot be eventually drained or filled up, form a perpetual source of danger to all in the neighbourhood through their retaining water and breeding mosquitoes; and, generally, such holes appear at intervals along the whole line, and are too extensive and far apart to be regularly oiled; but an attempt is made to deal, in the manner deemed most suitable, with those in close proximity to railway stations and important towns or villages.

141.—*Refuse and nightsoil*.—Refuse is disposed of by incineration at all important stations, and nightsoil is trenched.

142.—*Work done*.—Much useful work has been done in the way of clearance of bush and grass, draining or filling of swamps and pools, improving the drainage system, providing trenching grounds for nightsoil, erecting incinerators, kitchens, latrines, dustbins, and in generally maintaining all stations in a satisfactory state of cleanliness.

143.—*Farming along the sides of the line*.—By permitting the farming of land on both sides of the line a great improvement has taken place along a large part of the track.

INFECTIOUS DISEASES HOSPITALS.

144.—*Buildings at important centres and out-stations*.—Infectious diseases hospitals have been established at the most important centres.

Fortunately we have had comparatively few cases to treat during 1914, and when one occurs at an out-station, where no special building exists, a bush hut can be run up in a few hours, at comparatively small cost, and after the patient has been discharged the hut is burned down.

The extension of simple isolation hospitals to prisons and out-stations has received attention.

SANITARY STATIONS.

145.—*Establishment of stations at ports*.—The Sanitary stations established at Lagos and Forcados provide accommodation for Europeans and natives, and a similar arrangement was made last year at Bonny. We are thus in a position to deal with all cases of infectious disease which may be introduced from places outside Nigeria.

SANITATION OF PRISONS.

146.—*Improvements in sanitary condition of prisons*.—Great improvements have been made in the sanitary condition of prisons, and stricter measures have been adopted with regard to the personal hygiene of prisoners, the supply of properly cooked and good food and uncontaminated water.

Ventilation has been increased, and the floor area per prisoner has been enlarged in association cells by reduction of the number of prisoners.

Ample latrine and bathing accommodation have been provided in most prisons.

147.—*Some causes of high death rate among prisoners.*—Many prisoners are of such poor physique before they are incarcerated that separation from their people and confinement among strangers seems to have the effect of making some, at least, pine and die.

In other cases diseases such as dysentery, diarrhoea and ankylostomiasis are imported into prisons. These three, with pneumonia, are the diseases responsible for most deaths.

MARKETS.

148.—*Native markets.*—Steps were taken to provide native markets, *i.e.*, properly constructed sheds and stalls under Meat Market Regulations which are already in force, in important towns where open markets only have been held, thus giving us greater control with regard to the inspection of all articles of food exposed for sale.

SLAUGHTER HOUSES.

149.—*Gradual increase in the number of slaughter houses and improvement in their structure.*—It is regarded as a right by natives that they can kill an animal intended for sale at any time and at any place; but where the Public Health Ordinance applies an attempt has been made in some places, by adopting the simple expedient of constructing a concrete platform which may have a corrugated iron roof and designating it a “slaughter place,” to induce butchers to kill and dress the animals in one place, while allowing the public the privilege of slaughtering animals anywhere during occasions when they are holding feasts.

From this simple type of structure we have passed to the erection of more elaborate buildings, as we have to cater for the specialisation of butchers, and the native prejudice existing—usually where the Mohammedan population is large—against the slaughter of pigs in the same place as cattle, sheep and goats.

SEGREGATION.

150.—*A much needed reform.*—In the segregation of Europeans His Excellency has taken the initiative, and plans of the most important stations, showing the European and native areas and an uninhabited zone of a quarter of a mile in width outside the former, have been submitted for his approval.

The process must naturally be a slow one, but, when accomplished, its good effect on the health of Europeans, who, at present, suffer so much from living in close proximity to native dwellings, mostly of the poorer type, should be marked.

(b)—MEASURES TO SPREAD A KNOWLEDGE OF
HYGIENE AND SANITATION.

LECTURES.

151.—*Lectures by Medical Officers.*—Medical Officers have during the past year given many lectures and practical demonstrations, and their influence for good among the people has proved highly beneficial.

SCHOOL TEACHING.

152.—*Sanitation is part of the school curriculum.*—Sanitation is a component part of the school curriculum, and is therefore taught in all Government and state-aided schools, but the teachers themselves require to be better taught, in order that their pupils may derive the maximum benefit from the teaching. Still, progress is being made, as is manifested by the practical effects of the instruction given on the cleanliness of the children.

EXAMPLE.

153.—*Improvements resulting from example set by Europeans.*—One thing that strikes the uneducated native very forcibly is the mode of life of the European and the care he takes to maintain his compound in good sanitary condition, and there is ample evidence of this fact in the improvement of native dwellings and the desire to emulate, at all possible costs, the habits, and enjoy the privileges of the European and the more fortunate educated native.

(c)—RECOMMENDATIONS FOR FUTURE WORK.

1. The Appointment of one or more European Sanitary Inspectors under the Lagos Municipal Board to assist the Municipal Sanitary Officer, and the filling of vacancies at present existing in the Sanitary Staff of the Southern Provinces.

2. The building of permanent, but not necessarily costly, isolation hospitals at all important centres.

3. The provision of portable or fixed incinerators of the Horsfall type, capable of dealing with tropical refuse, in Lagos and the further extension of simple incinerators to important out-stations.

4. The provision of portable sanitary refuse bins to all Government compounds.

5. The compulsory cleaning of all markets and streets in towns and villages not under the Towns Ordinance, the chiefs or headmen being responsible for seeing that the work is properly done.

6. Before approval of a building site is given to a native, in places where the Health Ordinances do not apply, he should be required to sign an agreement to the effect that he shall clear and keep clear and level the ground, fill up all depressions with earth or sand and the surrounding land for a distance of 25 or 30 yards or half the distance between his lot and that of his neighbour.

7. Provision for an improved water supply at Forcados.

8. The erection of slaughter houses at Ibadan, Abeokuta and other towns where butchers are much in evidence.

9. The provision of separate meat and fish stalls where possible outside the general market at places as yet unprovided for, and where fish and meat are exposed for sale.

10. The compulsory protection of the roofs of all European bungalows by the insertion of roofing felt or other similar substance under corrugated iron or other roofing materials.

11. The supplying of pumps to all public wells and the erection of the former at least 6 feet to 10 feet away from the latter, which should be completely closed in by a concrete roof provided with a manhole in the centre.

12. The clearing and canalisation of streams in the vicinity of towns, more especially in areas where tsetse flies abound.

13. The constant and complete reclamation of swamps and the obliteration of pools in or near inhabited areas, and the more general use of subsoil drainage.

14. The erection of permanent barracks for all soldiers in places where it is the intention of Government to keep them.

15. The compulsory erection of rat-proof houses, warehouses and stores within 250 or 300 yards of wharves or other places where ships are loaded or discharged.

R. LAURIE,

Acting Senior Sanitary Officer.

26th August, 1915.

IV.—METEOROLOGY.

The normal seasons are as follows:—

The wet season is from April to October. The harmattan wind lasts from the middle of December to the middle of February. The tornado season from March to June.

The maximum rainfall is in June. During this month rain falls almost incessantly on the coast belt, the wettest stations being Forcados, Bonny, Calabar and Lagos.

The greatest rainfall for the year was 249·21 inches at Forcados, as compared with 243·96 inches for the previous year also at the same place. Oyo returns the least rainfall, *viz.*, 20·96 inches, as against 36·58 inches at Olokemeji the previous year. The greatest depth of rain for any one day was 15·04 inches at Bonny on the 5th September. Calabar holds the record of 179 days rain for the year without a single complete dry month. Oyo claims three complete dry months—January, February and August—and only 47 days rain for the remainder of the year.

The nights, for the greater part of the year, may be said to be tolerably cool, this is especially so in the harmattan season and is particularly noticeable in the high stations of the interior, where the maximum variation in temperature occurs; as much as 43° in one day being observed.

The highest temperatures are also recorded at these, what may be called, high and dry stations. Temperatures recorded on the coast are lower and the variation less, but the heat is felt to a greater extent owing to the high degree of humidity of the atmosphere.

There is nothing extraordinary to report in connection with the meteorology for 1914. The period from the end of June to October, 1914, was an exceptionally pleasant one, being cool and with little rain.

Seasonal variation does not appear to have any marked effect on the general health of Europeans; the native community suffer most during the rains and the harmattan.

V.—HOSPITALS AND DISPENSARIES.

The principal hospitals and dispensaries are at Lagos, Warri, Calabar, Ibadan, Onitsha and Sapele. The following is a brief account of these institutions and the work done in connection with them :—

Lagos Hospital.—The European wards contain 13 beds; the whole building is mosquito-proof, and there is a portion specially proofed for yellow fever cases.

In 1914 there were treated 114 officials.
124 non-officials.

Total 238

There were 3 deaths, 2 official and 1 non-official.

There have been practically no non-official Europeans admitted during the last half of the year, owing to the opening of a private hospital in Lagos.

The native wards consist of three blocks with a total of 52 beds for males and one block with 14 beds for females. All are efficiently mosquito-proofed, and there is special accommodation for yellow fever cases.

1,411 cases were treated, with 111 deaths.

A thoroughly up-to-date X-ray apparatus was installed during the year, and is proving of great value as an aid to diagnosis.

The institution is self-contained in a compound of about 4 acres, in which are enclosed the Resident Medical Officer's quarters, European Nurses' quarters, quarters for native staff who reside and mess within the compound, medical stores, dispensary, &c. There is a well equipped operating theatre situated conveniently to all the wards, a small laboratory, X-ray developing room and dark room for eye examinations, &c.

The out-patient department is well attended. There were 5,221 new cases treated and the total attendances were 24,091.

The staff consists of :—

- 1 Resident Medical Officer.
- 3 European Nurses.
- 1 Warden.
- 1 Medical Storekeeper.
- 1 Assistant warden.
- 23 Male native Nurses.
- 7 Female native Nurses.
- 1 Chief dispenser.
- 1 Second class dispenser.
- 2 Cooks.
- 2 Gatemen.
- 1 Watchman.
- 1 Carpenter.
- 1 Laundryman.
- 18 Labourers.

Revenue amounted to £996 1s. 3d.

The Infectious Diseases Hospital is situated on Ikoyi Plain, about two miles from Lagos. There are wards for small-pox, chicken-pox, yellow fever, measles, and tuberculosis in prisoners. All is mosquito-proof.

At Massey Street dispensary 6,706 cases were treated and there were 13,221 attendances.

At the Lagos Hospital there were 285 surgical operations performed during the year.

Warri Hospital.—The European ward contains 6 beds and is mosquito-proofed.

Officials admitted	...	...	...	10, deaths nil.
Non-officials admitted	...	...	...	48, „ 1
Total	...	...	...	58, „ 1

The native ward contains 30 beds and the Infectious Diseases Hospital 20.

Cases admitted, 304 ; deaths, 21.

Out-patient department.—3,411 new cases were admitted and there were 12,937 attendances.

There is an up-to-date operating theatre.

Number of surgical operations performed, 18.

The staff consists of:—

- 1 Medical Officer.
- 2 European Nurses.
- 8 Native Nurses.
- 12 Hospital servants.
- 2 Cooks.
- 1 Caretaker.
- 1 Attendant.

Calabar Hospital.—The European Hospital has 9 beds and is mosquito-proofed.

Officials admitted	...	...	...	50, deaths nil.
Non-officials admitted	...	...	...	71, „ „
Total	...	...	...	121

The Native Hospital (St. Margaret's) has 57 beds.

Admissions, 641 ; deaths, 37.

Out-patients department.—New cases ... 9,178.
 Attendances... 10,106.

237 cases (chicken-pox) were treated at the Infectious Diseases Hospital.

There is a well equipped operating theatre and a small laboratory.

Surgical operations performed, 99.

Ibadan Hospital.—The European Hospital has 5 beds and is mosquito-proofed.

Officials admitted	...	...	...	27, deaths 1
Non-officials admitted	...	...	...	22, „ 2
Total	...	...	...	49, „ 3

The Native Hospital is a brick building and contains 20 beds and is mosquito-proofed.

Admissions, 216 ; deaths, 32.

Out-patients department.—3,870 cases were treated and there were 6,035 attendances.

The staff consists of two native nurses and one dispenser.

A European nurse has been supplied from Lagos on several occasions when the seriousness of the cases in hospital required one.

Operations performed, 14 major and many minor.

Concentration camp for German prisoners of war.—Shortly after the outbreak of war, a concentration camp for prisoners of war was established at Moor Plantation, about three miles from Ibadan railway station. The situation was a good one, far removed from native dwellings, with good drainage and water supply. The housing accommodation was excellent, consisting of several cement buildings already on the site, supplemented by buildings of corrugated iron and wood and grass roofs. The sanitary arrangements were also excellent. The food was varied, plentiful and of good quality.

The total number of prisoners of war, with their wives and children, was 346. There was a great deal of sickness among them, for the most part of a preventable nature.

The chief causes of illness were venereal disease, malaria, sun traumatism and constipation and its sequelæ (from disinclination to take any form of exercise).

Four cases were practically invalided, *i.e.*, they were sent to Europe by the first steamer which took prisoners of war. The causes of invaliding were :—

Anæmia following blackwater fever	...	...	2
Anæmia, general after long stay in West Africa			1
Jaundice	...	...	1
			<hr/>
Total	...	...	4
			<hr/>

One death occurred from enteritis.

Ordinary cases not requiring much nursing were treated in the camp. Serious cases were brought into Ibadan Hospital.

The general health of the prisoners was very unsatisfactory, and due, in most cases, to their own carelessness in neglecting to use their mosquito-nets, sitting in the sun without any protection whatever, although ample was provided, and neglect of ordinary rational measures for preserving health.

Fifty-eight cases of illness were contracted before coming to the camp.

Onitsha Hospital.—The European hospital has 4 beds and is mosquito-proofed.

Admissions—Officials	...	...	15, deaths nil.
Non-officials	...	...	34, „ 2
			<hr/>
Total	...	...	49, „ 2
			<hr/>

A new native hospital was built during the year.

Admissions were 497, with 46 deaths.

Out-patient department.—Cases treated ... 4,909.
Attendances ... 8,986.

There is also an infectious diseases hospital which is mosquito-proofed. It has not been occupied during the year.

The staff consists of :—

- 2 European Nurses.
- 2 Native Nurses.
- 2 Dispensers.
- 2 Cooks.
- 5 Hospital servants.
- 2 Washmen.

Sapele Hospital.—The European Hospital has 4 beds.

Admissions—Officials	...	...	1, deaths nil.
Non-officials	...	...	34, „ „
Total	...	...	35

Native hospital, 16 beds.

Admissions, 414; deaths, 28.

Out-patient department.—Cases treated	...	2,024.
Attendances	...	7,054.

The staff consists of :—

- 1 Dispenser.
- 1 Native Nurse.
- 2 Hospital servants.
- 1 Cook and caretaker.

LUNATIC ASYLUMS.

There are lunatic asylums at Lagos (Yaba) and Calabar. The Yaba asylum has accommodation for 24 males and 24 females. There were 55 inmates during the year, of whom one was discharged as cured, 4 relieved and 4 died.

At Calabar there is accommodation for 22, males and females. 30 cases were treated, of whom 4 died.

LEPER ASYLUMS.

In the leper asylum at Yaba 15 cases were treated. In the settlements at Ibusa, Onitsha, Okpanam and Illah there were 110, 53, 63 and 32 inmates respectively.

INFECTIOUS DISEASES HOSPITAL, LAGOS.

This hospital is situated on the Ikoyi Plains, about 2 miles from the town.

A large area has been enclosed and divided into compounds, each having accommodation in brick buildings, of which there are four, for patients suffering from various infectious diseases.

There are the usual offices and quarters for attendants, and arrangements have been made for disinfection of clothing, &c., in a small building by itself.

QUARANTINE STATION, LAGOS.

The Quarantine Station was built in 1913, close to the base of the West Mole of Lagos Harbour, to replace the previous one washed away.

The buildings are all constructed of galvanized iron over concrete platforms, and comprise a hospital with 4 rooms, which are quite mosquito-proof, and three other buildings. Each of the latter, which are used for contacts, is provided inside with a wooden framework, over which is fixed a large mosquito-net, when the place is in occupation.

Quarters for attendants and the usual offices have been provided.

A caretaker lives on the premises.

VI.—SCIENTIFIC.

Ankylostomiasis.—An investigation was conducted, and is still in progress, into the prevalence of ankylostome infection, with a view to determining how far this disease and malaria are responsible for the anæmia and general ill-health so common to the country, and as to the best methods of prevention and treatment. From the results of the enquiry there can be no doubt that this is a very wide-spread disease.

Opinions differ as to the actual amount of ill-health caused by the parasite. It is generally difficult, in the ordinary course, to arrive at a conclusion, as patients rarely present themselves for treatment for this disease alone, but for some concurrent affection, which is usually found sufficient to account for the symptoms. Those who have observed the disease in other countries are of the opinion that the infection here is a mild one. Dr. T. B. Adam, whose excellent report will be found included under this section, has gone into the matter most carefully as to etiology, incidence and combination with malaria, prevention and treatment, and the facts brought out by him would go to show that more ill-health is caused by this parasite than is generally supposed, and that it has a greater effect on the health, in adults at least, than malaria.

There can be little doubt that by lowering the resistance of the victims of some other disease, such for instance as dysentery, with which it is almost invariably associated and so many cases of which end fatally, ankylostomiasis is a factor to be reckoned with.

The investigation is being continued with the object of ascertaining the most effective method of treatment and prevention.

Further study of the subject will no doubt indicate definite lines for the prevention and treatment of the disease.

In the investigations carried out in the various stations there was no evidence of a double infection of ankylostomiasis and malaria playing an active part in the anæmia and other symptoms. Ankylostomiasis appeared only to make its appearance in early adult life, while malaria appears to be a disease principally of children. A large proportion of the following figures were obtained from the gaols, very few children being available for examination.

Station.	Numbers examined.	Infection.		Station.	Numbers examined.	Infection.	
		Number.	Percentage.			Number.	Percentage.
Lagos Hospital ...	52	29	56	Aboh ...	72	59	82
Lagos Prison ...	25	10	40	Degema ...	189	69	36·5
Epe ...	30	nil	nil	Okigwi ...	26	2	7·6
Aro ...	30	5	16·6	Bonny ...	33	8	·25
Ebute Metta ...	10	10	100	Opobo ...	79	29	36·6
Badagry ...	79	59	75	Owerri ...	100	59	59
Yaba ...	68	57	84	Itu ...	—	—	10
Udi ...	18	9	50	Ogoja ...	68	nil	nil
Onitsha ...	102	80	78	Obudu ...	100	5	5
Warri ...	46	27	50	Afikpo ...	50	34	68
Benin ...	148	49	34	Ukpo ...	20	nil	nil
Forcados ...	120	28	23·3	Eket ...	100	90	90
Sapele ...	172	150	87·2	Ikot Ekpene ...	70 per cent. of those examined.		
Okwoga ...	—	—	17				

Trypanosomiasis.—Much valuable work has been done in connection with this disease by Dr. G. H. Gallagher, whose report, which is included, is the result of study of the disease at the Sleeping Sickness Camp at Ikotobo, in the Eket district, and at the Wellcome Research Laboratory during his last leave of absence ; by Dr. W. S. Clark on a tour of investigation in the Ikot Ekpene district ; and by Dr. E. J. Quirk in the Obudu district. These reports also well illustrate the difficulties with which one is beset in attempting any investigation amongst these pagan tribes, and the tact and patience required to overcome their suspicious and prejudices.

Blackwater Fever.—A report by the Director of the Medical Research Institute, which applies to both the Northern and Southern Provinces, is included.

It is interesting to note that of six blood films, examined at Yaba, three of which were taken during the first twenty-four hours of the disease, malaria parasites were found in all three. Of films examined which were taken later than the first day parasites were not found ; strong support for the contention of many authorities that malaria parasites can be found in all cases of blackwater fever during the first twenty-four hours if an exhaustive search is made for them. A thorough examination of the cases is often, however, not possible for the Medical Officer in the bush, where many cases occur, and he does not always have the opportunity of seeing the case during the first twenty-four hours.

Some interesting notes on an unusual complication of blackwater fever, by Dr. A. E. Neale, are included in the Appendix to this Report.

The following Reports are included :—

I. Annual Report, 1914, Medical Research Institute ; by Drs. Connal and Coghill.

II. Ankylostomiasis Report ; by Dr. T. B. Adam.

III. The Transmission of the *Trypanosoma brucei* of Nigeria by *Glossina tachinoides*, with some Notes on *Trypanosoma nigeriense* ; by Dr. G. H. Gallagher.

IV. Report of an Investigation into the Prevalence of Trypanosomiasis in Itu and Ikot Ekpene districts ; by Dr. W. S. Clark.

V. Report on Trypanosomiasis in the Obudu District ; by Dr. E. J. Quirk.

VI. Notes on some interesting cases ; by Dr. A. E. Neale.

VII. Report of Government Chemist for the Year 1914 ; by Mr. W. Ralston.

Work under this heading, as indeed work generally, has been greatly hindered by the outbreak of war, many Medical Officers having been taken from their stations and regular duties, and many and frequent transfers having been unavoidable.

Papers Published—

1. "A Note on the occurrence of a Plasmodium in the Blood of West African Monkeys," by H. Seidelin and A. Connal. *Ann. Trop. Med. and Paras.*, Vol. VIII., No. 1, April 21st, 1914.

2. "Sleeping Sickness in the Eket District of Nigeria," by J. W. Scott Macfie and G. H. Gallagher. *Ann. Trop. Med. and Paras.*, Vol. VIII., No. 3, December 15th, 1914.

3. "Notes on some Blood Parasites collected in Nigeria," by J. W. Scott Macfie. *Ann. Trop. Med. and Paras.*, Vol. VIII., No. 3, December 15th, 1914.

RETURNS.

TABLE I.

MEDICAL STAFF ON 31ST DECEMBER, 1914.

Principal Medical Officer	...	...	...	W. H. G. H. Best.
Senior Medical Officer, Grade I.	...	...	...	C. R. Chichester.
" " " " (Deputy Principal Medical Officer)	...	...	...	H. B. S. Montgomery.
Senior Sanitary Officer	...	...	...	J. A. Pickels.
Senior Medical Officer, Grade II.	...	...	...	W. I. Taylor.
" " " " III.	...	...	...	J. W. Collett.
" " " " "	...	...	...	W. F. Macfarlane.
" " " " "	...	...	...	M. E. O'Dea.
" " " " "	...	...	...	T. B. Adam.
Sanitary Officer	...	...	...	R. Laurie.
" " " " "	...	...	...	J. M. Dalziel.
" " " " "	...	...	...	W. D. Inness.
Medical Officer	...	...	...	A. W. S. Smythe.
" " " " "	...	...	...	F. J. A. Baldwin.
" " " " "	...	...	...	J. B. Bate (serving with the Army).
" " " " "	...	...	...	G. Hungerford.
" " " " "	...	...	...	D. A. Ashton.
" " " " "	...	...	...	J. C. Franklin.
" " " " "	...	...	...	R. W. Gray.
" " " " "	...	...	...	E. H. Tipper.
" " " " "	...	...	...	J. Currie.
" " " " "	...	...	...	J. C. M. Bailey.
" " " " "	...	...	...	H. R. Ellis.
" " " " "	...	...	...	F. B. Thompson.
" " " " "	...	...	...	J. S. Smith.
" " " " "	...	...	...	H. L. Burgess (seconded).
" " " " "	...	...	...	J. J. Moore.
" " " " "	...	...	...	E. J. Tynan
" " " " "	...	...	...	H. M. Newport.
" " " " "	...	...	...	A. H. Wilson.
" " " " "	...	...	...	T. M. R. Leonard.
" " " " "	...	...	...	T. R. Beale-Browne.
" " " " "	...	...	...	G. Beatty.
" " " " "	...	...	...	T. L. Craig.
" " " " "	...	...	...	J. H. McKay.
" " " " "	...	...	...	H. R. Morehead.
" " " " "	...	...	...	A. E. Neale.
" " " " "	...	...	...	G. Wilson.
" " " " "	...	...	...	S. L. G. D. MacLaine.
" " " " "	...	...	...	T. H. Suffern.
" " " " "	...	...	...	A. W. H. Grant.
" " " " "	...	...	...	E. M. Franklin.
" " " " "	...	...	...	W. S. Clark.
" " " " "	...	...	...	T. H. Rankin
" " " " "	...	...	...	C. W. O'Keeffe.
" " " " "	...	...	...	W. H. Seiger.

MEDICAL STAFF—*continued*.

Medical Officer	...	...	...	...	W. H. Peacock.
" "	...	...	...	...	R. C. Macpherson.
" "	...	...	...	...	G. F. Forde.
" "	...	...	...	...	G. H. Gallagher.
" "	...	...	...	...	F. Ross.
" "	...	...	...	...	C. G. Grey.
" "	...	...	...	...	J. P. B. Snell.
" "	...	...	...	...	L. H. Booth.
" "	...	...	...	...	E. L. Seiger.
" "	...	...	...	...	A. F. Kennedy.
" "	...	...	...	...	R. H. Brierley.
" "	...	...	...	...	E. C. Braithwaite.
" "	...	...	...	...	H. R. M. Ferguson.
" "	...	...	...	...	W. T. Martyn-Clark.
" "	...	...	...	...	E. J. J. Quirk.
" "	...	...	...	...	K. Manson.
" "	...	...	...	...	C. Kelsall.
" "	...	...	...	...	E. L. Anderson.
" "	...	...	...	...	T. R. Sandeman.
" "	...	...	...	...	W. R. Parkinson.
" "	...	...	...	...	F. M. P. Rice.
" "	...	...	...	...	K. K. Grieve.
" "	...	...	...	...	D. T. Birt (serving with the Army).
" "	...	...	...	...	H. North.
" "	...	...	...	...	W. E. Glover.
" "	...	...	...	...	H. H. Stewart.
" "	...	...	...	...	W. H. Kauntze.
" "	...	...	...	...	A. R. Paterson.
" "	...	...	...	...	E. Gibson.
" "	...	...	...	...	C. J. B. Pasley.
" "	...	...	...	...	C. Mackey.
Native Medical Officer	...	...	...	...	O. Sapara.
" " "	...	...	...	...	W. A. Cole.
" " "	...	...	...	...	K. Faderin.

EUROPEAN NURSING STAFF ON 31ST DECEMBER, 1914.

Senior Nurse	...	...	...	...	M. M. Graham.
" "	...	...	...	...	J. Grewer.
Nurse	...	...	...	...	E. K. Neville.
"	...	...	...	...	J. McCotter.
"	...	...	...	...	L. Single.
"	...	...	...	...	J. Y. Matthews.
"	...	...	...	...	E. M. Robinson.
"	...	...	...	...	E. M. Phillips.
"	...	...	...	...	D. Sturgess.
"	...	...	...	...	N. Seaton.
"	...	...	...	...	E. Daykin.
"	...	...	...	...	L. C. Benedict.
"	...	...	...	...	G. Mackenzie.
"	...	...	...	...	M. Jacomb.
"	...	...	...	...	L. Warner.
"	...	...	...	...	G. M. Graham.
"	...	...	...	...	F. C. Homan.

EUROPEAN SANITARY INSPECTORS.

Sanitary Inspector	...	...	...	...	C. Davies.
"	"	...	...	...	F. G. Payne.
"	"	...	...	...	E. Kirk.

PRINCIPAL MEMBERS OF SUBORDINATE STAFF.

First Class Clerk	...	...	...	...	G. Taylor.
"	"	"	...	...	G. S. Blankson.
"	"	"	...	...	A. J. Salvador.
"	"	"	...	...	E. B. Beckley.
"	"	"	...	...	J. H. King.
Second	"	"	...	...	J. R. Dodoo.
"	"	"	...	...	S. A. Cardoso.
"	"	"	...	...	J. F. Fakolujo.
"	"	"	...	...	E. L. Williams.
"	"	"	...	...	G. R. Howard.
"	"	"	...	...	O. F. Morgan.
"	"	"	...	...	F. S. Joaquim.
"	"	"	...	...	J. E. Tomlinson.
"	"	"	...	...	O. K. Disu.
"	"	"	...	...	A. A. Mayne.
"	"	"	...	...	E. B. Onimole.
"	"	"	...	...	S. A. Savage.
Third	"	"	...	...	P. A. Ephriam.
"	"	"	...	...	P. A. Munis.
"	"	"	...	...	B. F. Ajanaku.
"	"	"	...	...	J. I. Beckley.
"	"	"	...	...	E. J. E. Taylor.
"	"	"	...	...	B. Majekodunmi.

DISPENSING STAFF.

Chief Dispenser	...	...	...	...	A. E. Phillips.
Senior Dispenser	...	...	...	...	J. T. C. Robbin.
First Class Dispenser	...	...	...	...	R. A. Benjamin.
"	"	"	...	...	T. E. Macaulay.
"	"	"	...	...	S. A. Doherty.
"	"	"	...	...	S. Phillips.
"	"	"	...	...	E. C. Adigun.
"	"	"	...	...	V. E. Campbell.
"	"	"	...	...	J. G. Bajulai.
"	"	"	...	...	W. S. Sanniez.
"	"	"	...	...	J. A. Lolorunaja.
"	"	"	...	...	E. J. Lewis.
Second	"	"	...	...	Thirty-seven.
Dispensers-in-training	...	...	...	...	Eight.

NURSING STAFF.

First Class Nurses	...	...	...	...	Twenty-four.
Second	"	"	...	...	Thirty-one.
Nurses-in-training	...	...	...	...	Nineteen.

SUBORDINATE STAFF—*continued*.

STORES.

Warden, Lagos Hospital	...	...	...	S. O. Ohekeno
Storekeepers	...	...	...	Four.

ASYLUMS.

Attendants	...	...	...	...	Twenty-five.
Messengers	...	...	...	...	Six.

APPOINTMENTS TO NATIVE STAFF.

S. G. E. Taylor, as Third Class Clerk.
 Frank John, as Storekeeper.
 G. A. Gooding, as Second Class Dispenser.

INVALIDINGS.

N. A. Augustine, Nurse-in-training (died subsequently).

DEATHS.

T. P. Johnson, Gatekeeper.
 Anacleta Gomez, Second Class Nurse.
 N. A. Augustine, Nurse-in-training.

RESIGNATIONS.

S. H. A. Doherty, First Class Dispenser.
 Joanna Johnson, Nurse-in-training.

DISMISSALS.

T. Nappier, Second Class Dispenser.
 E. S. Collyer, Storekeeper (subsequently reinstated).
 Teresa Thomas, Senior Matron, Lunatic Asylum.
 E. J. Quarshie, First Class Nurse.
 J. W. J. Ekpo, Asylum Attendant.

PROMOTIONS.

J. G. Bajauli to be First Class Dispenser.
 Thomas Chukuma to be Second Class Nurse.
 Alexander Oke " " " "
 J. B. Lawson, " " " "
 Douglas Davies " " " "
 Elizabeth Savage to be Senior Asylum Attendant.
 Evan Hans " " " "

The following native officials served with the Cameroon Expeditionary Force :—Frank John, G. Ogun, S. Shodunke, K. A. John, D. Johnson, E. Shodunke, S. O. Shodeke, J. Shobo, C. Oke, E. J. D. Lewis, J. A. B. Hart, J. Drayton, A. A. Roberts, J. A. Hill.

TABLE II.

FINANCIAL.

STATEMENT OF EXPENDITURE IN THE YEAR 1914.

Under Sub-Heads as compared with the Estimates.

ITEM.	MEDICAL—Head 7—Colony.						ESTIMATE, 1914.	ACTUAL EXPENDITURE, 1914.		
							£	£	s.	d.
	PERSONAL EMOLUMENTS	...	...	...	...		12,616 S.W. 476	}	10,900 5 6	
	OTHER CHARGES—									
28	Clothing, bedding and equipment	...	...	...	...		800	}	356 16 11	
29	Diets, provisions and necessities	...	...	...	...		2,100 S.W. 300		2,279 19 0	
30	Medicines	...	...	...	...		1,450	}	785 18 4	
31	Fuel, light and sundries	...	...	...	...		50		44 18 0	
32	Surgical instruments, &c.	...	...	...	...		300	}	273 15 8	
33	Upkeep of medical libraries	...	...	...	...		60		44 13 7	
34	Vaccination expenses	...	...	...	...		360 S.W. 55	}	424 11 7	
35	Fees to Government medical officers for successful vaccination	...	...	...	...		10		—	
36	Upkeep and equipment of new I. D. Hospital	...	...	...	...		50	}	—	
37	Uniforms for staff or allowance in lieu thereof	...	...	...	...		75		68 11 6	
38	Night allowance to hospital labourers...	...	...	...	...		14 S.W. 1	}	13 13 9	
39	Horse, rickshaw and bicycle allowances	...	...	...	...		280		171 10 6	
40	Bicycle for medical office	...	...	...	...		6	}	6 0 0	
41	Passages...	...	...	...	...		708		393 5 10	
42	Maternity hospital charges	...	...	...	...		372	}	301 15 11	
	TOTAL	...	...	...	...		£20,083		£16,065 16 1	

ITEM.	LABORATORY—Head 8.						ESTIMATE, 1914.	ACTUAL EXPENDITURE, 1914.		
							£	£	s.	d.
	PERSONAL EMOLUMENTS	...	...	...	...		655	}	647 2 8	
	OTHER CHARGES—									
5	Instruments and re-agents	...	...	...	...		50	}	47 9 0	
6	Bicycle allowance	...	...	...	...		8		6 8 4	
7	Passages...	...	...	...	...		31	}	35 8 5	
	Total	...	...	...	...		£744		£736 8 5	

ITEM.	SANITARY—Head 9—Colony.						ESTIMATE, 1914.	ACTUAL EXPENDITURE, 1914.		
							£	£	s.	d.
	PERSONAL EMOLUMENTS...	...	...	...	...		1,028 S.W. 233	}	879 16 5	
	OTHER CHARGES—									
10	General sanitary	...	...	...	...		200	}	73 16 2	
11	Labour	...	...	...	...		247 S.W. 86		252 7 3	
12	Disinfectants	...	...	...	...		100	}	102 4 9	
13	Uniforms for Sanitary Inspectors	...	...	...	...		8		4 13 0	
14	Upkeep of Clayton disinfectors at Lagos	...	...	...	...		90	}	14 3 2	
15	Record of vital statistics	...	...	...	...		66		43 6 1	
16	Library of sanitary literature	...	...	...	...		50	}	37 7 9	
17	Maintenance, &c., of persons isolated at quarantine or isolation station	...	...	...	...		150		49 0 3	
18	Transport	...	...	...	...		10	}	5 3 0	
19	Mosquito netting	...	...	...	...		S.W. 30		—	
20	Compensation, fumigation operations, 1913	...	...	...	...		S.W. 40.0.3	}	—	
	TOTAL	...	...	...	...		£2,347.0.3		£1,461 17 10	

TABLE II.—*continued.*

ITEM.	MEDICAL—Head 14—Southern Provinces.	ESTIMATE, 1914.	ACTUAL EXPENDITURE, 1914.		
		£	£	s.	d.
	PERSONAL EMOLUMENTS {	48,998 <i>S. Ws. 938</i>	} 46,887	8	0
	OTHER CHARGES—				
64	Outfit allowance to European Nurses... .. {	96 <i>S. W. 24</i>	} 120	0	0
65	Outfit allowance to Medical Officers {	96			
66	Medical examination of officers in England {	250	} 169	1	0
67	Expenses of doctors and nurses at School of Tropical Medicine, and fees on engagement of and reserve of Medical Officers in England {	800			
68	Expeditionary equipment {	350	} 139	3	5
69	Clothing, bedding and equipment {	570			
70	Washing, European and native hospitals {	180	} 173	19	6
71	Diets, provisions and necessities {	2,200			
72	Medicines {	2,500 <i>S. W. 780</i> <i>S. W. 400</i>	} 2,924	12	4
73	Fuel, light and sundries {	95			
74	Surgical instruments and apparatus {	1,480 <i>S. W. 550</i>	} 1,752	19	10
75	Upkeep of medical libraries {	10			
76	Fees to Government Medical Officers for successful vacci- nations performed {	1,040 <i>S. W. 17</i>	} 1,027	9	0
77	Entomological equipment {	100			
78	Medical comforts {	270	} 212	2	0
81	Uniforms for staff or allowance in lieu thereof {	100			
82	Expenses of Leper Settlement, Onitsha {	300	} 252	15	7
83	Maintenance Sleeping Sickness Camp, Eket {	500 <i>S. W. 100</i>			
84	Dental surgery expenses {	70 <i>S. W. 238</i>	} 309	16	10
85	Horses, rickshaw, bicycle, &c., allowances {	936			
86	Travelling allowances {	1,030 <i>S. W. 18</i>	} 705	14	6
87	Bush allowances {	400 <i>S. W. 28</i>			
88	Passages... .. {	4,487	} 3,088	7	7
89	Transport {	1,585			
90	Contingencies and petty office expenses {	25	} 32	4	11
91	Maintenance of lunatics at Kissy Asylums {	250			
92	Contribution to the Tropical Diseases Research Fund {	350	} 400	0	0
93	Donation to the London Tropical School of Medicine {	200			
94	Contribution to Advisory, Medical and Sanitary Committee for Tropical Africa {	50 <i>S. W. 28</i>	} 77	15	7
95	Contribution to the Tropical Diseases Bureau {	200			
96	Vaccination expenses {	640 <i>S. W. 66</i>	} 660	14	6
97	Yellow fever investigation {	1,746			
	TOTAL {	£71,904	} £64,743	11	4
	<i>S. Ws.</i> {	£3,187			

TABLE II.—*continued.*

ITEM.	MEDICAL RESEARCH INSTITUTE—Head 15.	ESTIMATE, 1914.	ACTUAL EXPENDITURE, 1914.		
		£	£	s.	d.
	PERSONAL EMOLUMENTS... {	1,589	}	1,254	10 0
	S.W. 8				
	OTHER CHARGES—				
10	Horse and bicycle allowances ...	50		13	2 9
11	Travelling allowances ...	30		10	0
12	Purchase of books for library ...	50		47	1 4
15	Labour ...	124		103	16 8
17	Equipment and necessities ...	160		148	5 8
18	Upkeep of new laboratory, cattle, &c....	100		57	7 3
19	Passages... ..	93		113	15 1
20	Bush allowance ...	S.W. 30		29	18 0
	TOTAL ...	£2,234		£1,768	6 9

ITEM.	SANITARY—Head 16—Southern Provinces.	ESTIMATE, 1914.	ACTUAL EXPENDITURE, 1914.		
		£	£	s.	d.
	PERSONAL EMOLUMENTS... ..	6,403	4,343	12	8
	OTHER CHARGES—				
20	General sanitary ...	1,600	907	12	7
21	Labour ...	4,733	3,700	7	2
22	Disinfectants ...	450	457	10	7
24	Uniforms ...	120	47	1	9
27	Sanitary work, European reservations and sanitary stations	900	862	5	4
29	Conservancy of latrines, Calabar ...	1,000	567	7	4
30	Upkeep of Clayton disinfecter... ..	60	3	12	0
31	Horse, hammock, rickshaw and bicycle allowances ...	205	129	17	4
32	Travelling allowances ...	300	47	0	0
33	Passages ...	281	156	16	6
34	Transport ...	55	29	12	9
35	Maintenance, &c., of persons isolated at quarantine or isolation station ...	200	14	12	6
36	Instruction of Sanitary Inspectors ...	200	56	0	9
36A	Mosquito netting ...	S.W. 170	—		
	TOTAL ...	£16,677	£11,323	9	3

RECEIPTS.—HEAD 2.

Hospital and Medical Receipts £3,077 6 8

TABLE III.

RETURN OF STATISTICS OF POPULATION FOR THE YEAR 1914.

		Europeans and whites.	Africans.	East Indians.	Chinese and Malay.	Mixed and coloured.	Remarks.
Number of inhabitants in 1913	...	1,650	7,856,000	99	—	487	Figures taken from Annual Report 1913 and census of 1911.
“ “ births during the year 1913...		—	—	—	—	—	Not known.
“ “ deaths	“	—	—	—	—	—	“
“ “ immigrants	“	—	—	—	—	—	“
“ “ emigrants	“	—	—	—	—	—	“
“ “ inhabitants in 1914	...	1,800	7,891,000	99	—	487	Figures for Europeans and Africans supplied by Intelligence Department. “ “ East Indians and mixed and coloured from census, 1911.
Increase of	... ..	150	35,000	—	—	—	Estimated increase of 35,000 on census of 1911 owing to opening of new territory.
Decrease of	... ..	—	—	—	—	—

TABLE IV.

SUMMARY OF ROUTINE SANITARY WORK DONE DURING THE YEAR.

(1)—AREAS.

	1912.		1913.		1914.	
	Area in acres.	Open spaces.	Area in acres.	Open spaces.	Area in acres.	Open spaces.
Lagos and Ebute-Metta	1,152	3	1,152	3	1,152	3
Warri	800	...	800	...	800	...
Calabar	113,000	3	113,000	3	113,000	3
Port Harcourt ... ..	...	...	...	...	1,513	7

(2)—POPULATION.

	1912.			1913.			1914.		
	Natives.	Euro-peans.	TOTAL.	Natives.	Euro-peans.	TOTAL.	Natives.	Euro-peans.	TOTAL.
Lagos and Ebute-Metta ...	80,500	585	81,085	75,616	694	76,310	76,011	694	76,705
Warri	2,449	64	2,513	2,652	73	2,725	2,652	67	2,719
Calabar	16,720	148	16,868	14,741	148	14,889	14,263	148	14,411
Port Harcourt ... ..	...	...	...	...	...	...	5,000	105	5,105

(3)—HOUSING.

	1912.				1913.				1914.			
	HOUSES.		HUTS.		HOUSES.		HUTS.		HOUSES.		HUTS.	
	Euro-pean.	Native.	Euro-pean.	Native.	Euro-pean	Native.	Euro-pean.	Native.	Euro-pean.	Native.	Euro-pean.	Native.
Lagos and Ebute-Metta ...	233	...	...	10,742	206	...	...	10,742	263	4,011	...	12,000
Warri	30	87	...	95	30	...	...	93	30	124	...	116
Calabar	64	44	...	2,046	64	...	...	2,043	57	50	...	2,253
Port Harcourt ... ..	...	...	...	...	...	...	...	...	24	78	36	425

(4)—MOSQUITO PROTECTION OF HOUSES.

	1912.				1913.				1914.			
	Wholly protect-ed.	With mosquito room.	Wholly protected in 1912.	Partially protected in 1912.	Wholly protect-ed.	With mosquito room.	Wholly protected in 1913.	Partially protected in 1913.	Wholly protect-ed.	With mosquito room.	Wholly protected in 1914.	Partially protected in 1914.
Lagos and Ebute-Metta ...	22	87	20	39	22	50	5	17	23	94	...	...
Warri ... ..	...	13	...	2	...	13	...	2	...	17	...	4
Calabar	1	4	1	2	1	5	...	2	1	5	...	1
Port Harcourt ... ..	...	...	...	...	...	...	...	...	...	11	...	...

TABLE IV.—*continued.*

(5)—ERECTION OF NEW BUILDINGS DURING THE YEAR.

	1912.					1913.					1914.				
	Public bldgs. with sanction.	Houses with sanction.	Huts with sanction.	Houses without sanction.	Huts without sanction.	Public bldgs. with sanction.	Houses with sanction.	Huts with sanction.	Houses without sanction.	Huts without sanction.	Public bldgs. with sanction.	Houses with sanction.	Huts with sanction.	Houses without sanction.	Huts without sanction.
Lagos and Ebute-Metta	...	113	290	...	...	...	163	415	...	...	...	116	327	...	...
Warri	9	16	2	2	2	1	...	2	...	...	2	3	30	...	...
Calabar	2	2	1	7	16	1	1	...	2	...	2	...	22	...	1
Port Harcourt ... ..	...	...	...	...	...	...	...	...	...	...	...	...	425	...	...

(5)—ACTION TAKEN.

[illegible]

(6)—MARKETS.

				1912.			913.			1914.		
				Number.	Paved and drained.	Unpaved.	Number.	Paved and drained.	Unpaved.	Number.	Paved and drained.	Unpaved.
Lagos and Ebute-Metta	...			10	4	6	10	4	6	13	6	7
Warri	...	...	...	1	...	1	1	...	1	1	...	1
Calabar	...	...	...	3	...	3	3	...	3	3	...	3
Port Harcourt	...	...	...	...	...	...	...	...	...	1	...	1

(7)—SLAUGHTER HOUSES.

	1912.			1913.			1914.		
	Number.	Paved and drained.	Un-paved.	Number.	Paved and drained.	Un-paved.	Number.	Paved and drained.	Un-paved.
Lagos and Ebute-Metta ...	2	2	...	2	2	...	2	2	...
Warri	1	1	...	1	1	...	1	1	...
Calabar	1	1	...	1	1	...	1	1	...
Port Harcourt ... ..	...	...	...	...	...	...	1	1	...

TABLE IV.—*continued.*

(11)—AVERAGE DAILY NUMBER OF CARTLOADS OF TIN, CANS, BOTTLES, &c., REMOVED FROM HUTS AND COMPOUNDS.

	1912.	1913.	1914.
Lagos and Ebute-Metta ...	...	...	...
Warri ...	...	...	16
Calabar ...	16	16	16
Port Harcourt ...	...	...	...

TABLE IV.—continued.

(12)—WATER SUPPLY, 1912.

PIPE-BORNE WATER.				WELLS.		TANKS.										BARRELS.							
				PUBLIC.		PRIVATE.		PUBLIC.					PRIVATE.					NATURE.			Mos-quito pro-protected.		
				Number.	Mos-quito pro-protected.	Number.	Mos-quito pro-protected.	Under ground.	Mos-quito pro-protected and pump.	Above ground.	Mos-quito pro-protected.	400 gallons or less.	Above 400 gallons.	Under ground.	Mos-quito pro-protected.	Above ground.	Mos-quito pro-protected.	400 gallons or less.	Above 400 gallons.	Wood.		Iron.	Cement.	Number.
Lagos and Ebute-Metta ...	Well	4,577	28	101	19	2,221	...	..	2	2	2	...	1	1	680	634	601	80	2	514	165	1,078	326
Warri ...	...	...	...	8	8	17	...	...	...	...	...	...	7	7	121	121	6	122	...	106	22	...	...
Calabar ...	Spring	19,802	95	...	...	3	...	2	4	...	...	...	1	1	10	5	11	38	...	88	8	...	...
Port Harcourt ...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...

(12)—WATER SUPPLY, 1913.

Lagos and Ebute-Metta { Pumped from Well }	...	5,077	44	101	20	2,476	...	...	...	2	2	2	...	1	1	705	642	642	66	1	560	147	1,078	326
Warri ...	...	...	...	8	8	19	19	7	...	...	...	...	...	7	7	124	124	9	122	...	109	22	...	...
Calabar ...	Well	19,802	95	3	3	2	...	1	4	...	...	...	...	1	1	10	5	11	...	...	12	3	...	...
Port Harcourt ...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1	...	...

(12)—WATER SUPPLY, 1914.

Lagos and Ebute-Metta { Well and River }	...	5,077	44	101	20	2,600	...	...	...	2	2	2	...	1	1	702	657	636	67	1	556	146	1,274	481
Warri ...	...	...	...	8	8	20	20	7	...	...	...	...	...	7	7	128	128	9	126	...	113	22	...	...
Calabar ...	Spring	19,900	95	...	...	1	1	1	2	4	...	4	6	1	1	21	13	...	21	...	21	1	500	1
Port Harcourt ...	Well	...	...	8	4	...	...	...	...	...	...	...	...	...	...	19	19	18	1	...	19	...	...	...

TABLE IV.—continued.

(14)—CLEARANCE OF UNDERGROWTH, &c.

	1912.			1913.		1914.	
	Square yards of weeds, grass, &c., cut and removed.	Frequency of Clearance.		Square yards of weeds, grass, &c., cut and removed.	Frequency of clearance.	Square yards of weeds, grass, &c., cut and removed.	Frequency of clearance.
Lagos and Ebute-Metta	5,575,680	Regularly
Warri	340	Monthly	340	Monthly	340	Monthly
Calabar	69,184	Monthly	104,732	Monthly	70,000	Monthly
Port Harcourt	Quarterly

(15)—EXCAVATIONS AND LOW LYING LAND.

	1912.							1913.							1914.						
	Pools and excavations.	Excavations filled up.	Marsh land raised and drained.	Pools, &c., fish stocked.	Cubic yards material used for filling.	Persons fined for new excavations.	Men employed filling up pools.	Pools and excavations.	Excavations filled up.	Marsh land raised and drained.	Pools, &c., fish stocked.	Cubic yards material used for filling.	Persons fined for new excavations.	Men employed filling up pools.	Pools and excavations.	Excavations filled up.	Marsh land raised and drained.	Pools, &c., fish stocked.	Cubic yards material used for filling.	Persons fined for new excavations.	Men employed filling up pools.
Lagos and Ebute-Metta	...	...	Sq. Yds. 60,016	...	102,957	...	...	...	...	Sq. Yds. 35,090	...	9,662	...	...	...	...	Sq. Yds. 300	...	...	...	...
Warri	...	3,984	...	...	...	...	20	...	3,614	...	...	...	...	20	...	1,954	...	...	7,000	...	20
Calabar	44	99	...	...	...	...	...	...	12	...	...	...	...	10	181	170	...	...	...	...	20
Port-Harcourt	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...

TABLE IV.—continued.
(16)—OILING.

	1912.						1913.						1914.					
	Drains oiled.	Pools and excavations oiled.	Tanks and barrels oiled.	Men daily employed for oiling.	Drains oiled.	Pools and excavations oiled.	Tanks and barrels oiled.	Men daily employed for oiling.	Drains oiled.	Pools and excavations oiled.	Tanks and barrels oiled.	Men daily employed for oiling.	Drains oiled.	Pools and excavations oiled.	Tanks and barrels oiled.	Men daily employed for oiling.	Drains oiled.	Pools and excavations oiled.
Lagos and Ebute-Metta ...	1,122	5,001	56	12	185	9,204	74	4	232	20,254	278	4	1,421	514	1,302	4	1,421	514
Warri ...	2,180	642	254	4	3,294	3,467	183	4	...	...	...	...	15	...	...	1	...	...
Calabar ...	...	...	...	...	...	...	...	...	...	...	...	...	6	4	..	3	...	...
Port Harcourt ...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...

(17)—INSPECTIONS AND PROSECUTIONS.

	1912.								1913.								1914.								
	Inspectors employed.	Houses inspected.	Houses with larvæ.	Notices for larvæ.	Fines for larvæ.	Notices for insanitary conditions.	Fines for insanitary conditions.	Soda water factories.	Inspectors employed.	Houses inspected.	Houses with larvæ.	Notices for larvæ.	Fines for larvæ.	Notices for insanitary conditions.	Fines for insanitary conditions.	Soda water factories.	Inspectors employed.	Houses inspected.	Houses with larvæ.	Notices for larvæ.	Fines for larvæ.	Notices for insanitary conditions.	Fines for insanitary conditions.	Notices for insanitary conditions.	Fines for insanitary conditions.	Soda water factories.
Lagos and Ebute-Metta ...	29	495,105	26,779	...	848	5,516	70	...	30	533,679	20,043	...	961	4,771	36	2	33	608,747	20,349	...	1,202	3,259	5	2	
Warri ...	4	51,171	178	27	60	128	118	...	4	39,842	136	49	23	90	18	...	5	43,523	229	123	21	82	10	...	
Calabar ...	4	15,490	205	91	23	106	23	...	5	120,948	693	2,321	19	2,064	41	1	8	107,464	360	264	106	40	38	...	
Port Harcourt ...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	2	2,555	31	...	1	17	...	...

(17)

	LAGOS AND EBUTE-METTA.					WARRI.					CALABAR.					PORT HARCOURT.				
	First quarter.	Second quarter.	Third quarter.	Fourth quarter.	Total.	First quarter.	Second quarter.	Third quarter.	Fourth quarter.	Total.	First quarter.	Second quarter.	Third quarter.	Fourth quarter.	Total.	First quarter.	Second quarter.	Third quarter.	Fourth quarter.	Total.
Houses inspected ...	141,158	151,597	156,730	159,262	608,747	11,137	9,343	11,395	11,648	43,523	29,884	28,995	24,974	23,612	107,464	120	309	886	1,240	2,555
Houses with larvæ ...	4,055	6,802	5,024	4,468	20,349	56	75	61	37	229	39	88	98	135	360	...	9	10	12	31
Mosquito index, 1914	2.8	4.4	3.2	2.8	3.3	0.5	0.8	0.5	0.3	0.5	0.1	0.3	0.3	0.5	0.3	...	2.9	1.1	0.9	1.2
" " 1913	2.4	4.4	4.3	3.7	3.7	0.2	0.5	0.4	0.2	0.3	0.2	0.6	0.8	0.4	0.5	...	No record.	No record.	0.9	...
Rainfall, 1914	5.8	40.3	10.8	11.9	68.9	9.8	39.4	23.8	16.8	89.9	12.0	56.3	34.1	19.9	122.5	...	No record.	No record.	...	...
" " 1913	4.03	27.73	23.45	5.44	60.65	6.6	24.5	70.0	10.9	112.1	5.9	31.3	64.3	27.1	128.8	...	No record.	No record.	...	...

TABLE IV.—*continued.*

(18)—RETURN OF ANTI-MOSQUITO WORK, 1914.

	Houses inspected, 1914.	Number of houses with larvæ, 1914.	Rainfall, 1914.	Rainfall, 1913.	Mosquito index, 1914.	Mosquito index, 1913.
Lagos and Ebute-Metta ...	608,747	20,349	68·9	61·86	3·3	3·7
Warri	43,523	229	89·9	112·16	0·5	0·3
Calabar	107,464	360	122·5	128·84	0·3	0·5
Port Harcourt	2,555	31	...	...	1·2	...

(19)—ANNUAL SANITARY REPORT ON PRISONS FOR 1914.

	Average number of prisoners per night.	Site area in sq. yds. per prisoner.	Average floor space of cells per prisoner.	Average cell space in cub. ft. per prisoner.	Average vent. space in sq. ft. per prisoner.	Total number of prisoners medically treated.	Total number of prisoners unfit for duty.	Average number of days prisoners unfit for duty.	Death rate per 1,000 per annum.
Abeokuta	118	74·1	65	726·9	7·2	464	108	10·4	25·4
Badagry	35·6	25·3	59	479·3	6·3	82	9	11·7	84·2
Epe	30	Open.	36	361	5·1	125	20	17·7	Nil
Ibadan	121·2	28	26	261·3	3·5	374	113	6·2	16·5
Lagos	287	51·2	47	476·0	6·2	1,618	294	9·4	69·6
Agbor	108·9	44·6	42	494·5	5·5	218	65	6·9	18·3
Asaba	52·9	47·2	50	750·7	1·9	163	32	3·9	56·8
Benin	76·2	52	37	375·3	2·0	512	90	6·7	13·1
Forcados	120·5	73·5	30	335·8	2·9	574	269	6·4	132·7
Ifon	22·7	90·3	44	440·6	2·1	...	...	...	44·0
Kwale	89·1	51·5	33	338·9	2·3	262	30	7·2	44·8
Okwoga	54·5	38·1	17	173·2	1·5	111	55	9·3	73·3
Onitsha	143·1	51·2	49	491·4	5·8	487	170	9·0	230·6
Sapele	158·1	87·4	52	474·6	9·1	494	261	9·8	107·5
Udi	90·9	16·6	18	220	1·4	374	264	12·9	627·0
Warri	145·2	20·6	23	212	1·8	444	136	6·6	48·2
Ishan	81·7	25·5	24	218·8	2·9	123	18	25·0	48·9
Calabar	388·5	28·6	37	409·2	6·8	1,297	269	8·8	51·4
Opobo	181·2	19·5	41	499·5	10·2	390	133	10·3	38·6
Degema	180·9	37·8	35	357·2	6·3	623	47	14·1	27·6
Brass	42·5	64·5	53	545·1	3·6	140	38	8·4	47·0
Owerri	200·1	44·6	41	518·4	3·6	758	247	7·0	239·8
Afikpo	170·2	21·7	21	216·7	9·6	427	250	18·4	99·8
Ogoja	61·7	72·6	44	525·0	7·2	131	31	3·4	16·2
Obudu	40·3	241·7	140	1,402	12·0	100	35	10·1	74·4
Abakaliki	43·2	73	80	805	10·5	110	19	12·9	69·3
Obubra	61·5	56·4	46	550	13·4	242	72	6·4	65·0
Ikot-Ekpene	274·5	67·5	55	550·5	6·8	735	253	8·6	32·7
Bonny	54·0	41·1	52	627	18·5	269	96	8·6	Nil
Port Harcourt	588·6		Bush	Huts.		1,117	723	14·8	86·6

(20)

District.	Ages of those examined.	0-2 years.	2-5 years.	5-10 years.	10-15 years.	15-20 years.	20-30 years.	30-40 years.	Over 40 years.	Totals.	Per- cent- ages.
Warri	Number examined	29	47	105	96	68	11	6	...	362	...
	Number normal	8	19	58	64	52	9	2	...	212	58·6
	Number slightly enlarged	3	1	21	13	10	...	...	...	48	13·2
	Number enlarged beyond costal margin	18	27	26	19	6	2	4	...	102	28·2
Calabar	Number examined	5	16	16	26	34	172	67	12	348	...
	Number normal	1	7	7	16	24	130	49	7	241	69·2
	Number slightly enlarged	1	9	8	4	10	30	16	3	81	23·3
	Number enlarged beyond costal margin	3	...	1	6	...	12	2	2	26	7·5
Port Harcourt	Number examined ... ..	...	...	5	113	149	153	33	...	453	...
	Number normal ... ..	...	...	3	81	108	124	30	...	346	76·6
	Number slightly enlarged ... ..	...	...	1	26	34	28	3	...	92	20·3
	Number enlarged beyond costal margin	...	...	1	6	7	1	...	...	15	3·3

TABLES VI. & VII.

YEARLY RETURN OF PATIENTS.

STATION, SOUTHERN PROVINCES ; YEAR 1914.

GENERAL SUMMARY.

	Out-patients.	In-patients.	NUMBER ON SICK LIST.*		Total days on sick list during year.	Invalided.	Deaths.	Residents.
			Remaining from previous year.	New cases.				
EUROPEAN :—								
Officials ...	1,257	275	3	742	4,488	41	5	1,740
Non-Officials ...	1,247	343	9	427	3,951	45	17	1,359
Total ...	2,504	618	12	1,169	8,439	86	22	3,099
Native Officials	4,146	510	47	1,268	6,867	7	6	2,180

NATIVES OTHER THAN GOVERNMENT OFFICIALS.

In-patients.	OUT-PATIENTS.		Deaths.
	New cases.	Total attendances.	
7,717	70,522	418,397	533

* This number is not necessarily equal to the sum of the first and second columns. It refers to patients unable to attend duty through illness.

TABLE VII.—RETURN OF DISEASES AND DEATHS FOR THE YEAR 1914—*continued*.

EUROPEANS.														
DISEASE.	GOVERNMENT OFFICIALS.										NON-OFFICIALS.			
	Remained from last year.		Admissions.		On sick list.		Invalided.	Deaths.	Remaining end of year.		Total under treatment.		Invalided.	Deaths.
	Intern.	Extern.	Intern.	Extern.	Number.	Total days.			Intern.	Extern.	Intern.	Extern.		
INFECTIVE DISEASES :—														
Beri-beri
Cerebro-spinal fever
Chicken-pox	1	1	16	...	...	...	...	...	...	...	...
Cholera
Dengue
Diphtheria
Dysentery	12	11	19	148	1	...	...	...	15	5	2	...
Endocarditis—infective
Enteric	2	...	...	...
Erysipelas
Gonorrhœa	9	...	...	...	...	...	...	2	54	...	...
Influenza	1	...	5	2	7	...	...	...	1	...	1	...	...
Kala-Azar
Leprosy (a) Nodular
(b) Anæsthetic
Malaria (a) Tertian
(b) Quartan
(c) Aestivo-autumnal	2	2	82	195	231	1,126	...	...	1	1	137	217	10	3
(d) Chronic malaria	1	...	4	5	13	...	...	...	...	1	...	1	...
(e) Blackwater fever	5	3	8	147	4	2	...	...	11	1	2	3
Measles	1	1	12	...	...	...	...	...	2	...	2
Undulant fever
Plague
Pneumonia	2	...	2	49	...	...	1	...	1	...	1	...
Rabies
Relapsing fever
Rheumatic fever	2	5	5	81	...	...	...	...	2	...	...	...
Septicæmia	1	...	1	7	...	1	...	...	...	...	...	...
Trypanosomiasis (sleeping sick- ness)	1	...	1	7	...	...	...	...	...	...	...	...
Small-pox
Syphilis (a) Primary	1	...	1	...	...	...	...	...	1	1	1	...
(b) Secondary	2	...	2	6	1	...	...	...	5	7	...	...
(c) Inherited	3	...	...	...	...	...	...	...	1	...	...	...
Tetanus
Tuberculosis	1	2	3	18	2	...	...	...	3	1	1	...
Whooping cough
Yaws
Yellow fever	1	...	1	13	...	...	...	...	3	4	...	4
Other diseases	3	...	...	...
INTOXICATIONS :—														
Alcoholism	4	...	4	17	...	...	...	...	5	1	1	...
Morphinism
Others
GENERAL DISEASES :—														
Anæmia	7	35	12	103	3	...	...	...	5	41	3	...
Anæmia—Pernicious	1	6	1	3	...	...	...	...	...	14	...	...
Diabetes
Exophthalmic goitre
Gout...
Leucocythæmia
Hodgkin's disease
Myxœdema...
Purpura
General debility	1	...	...
Other diseases	1	...	...	...	...	...	...	...	...	...	...
Chronic rheumatism	4	40	19	142	1	...	...	...	4	31	...	...
LOCAL DISEASES :—														
Diseases of the Nervous System :—														
Sub-section 1—														
Neuritis	5	13	12	119	2	...	...	...	3	2	1	1
Meningitis	1	...	...	1
Myelitis
Hydrocephalus
Encephalitis
Abscess of brain...
Congestion of brain
Other diseases	2	9	9	35	1	...	...	2	...	1	...	...

TABLE VII.—RETURN OF DISEASES AND DEATHS FOR THE YEAR 1914—*continued.*

DISEASES.	EUROPEANS.													
	GOVERNMENT OFFICIALS.										NON-OFFICIALS.			
	Remained from last year.		Admissions.		On sick list.		Invalided.	Deaths.	Remaining end of year.		Total under treatment.		Invalided.	Deaths.
	Intern.	Extern.	Intern.	Extern.	Number.	Total days.			Intern.	Extern.	Intern.	Extern.		
LOCAL DISEASES—continued:—														
Diseases of the Nervous System—														
continued:—														
Sub-section 2—														
Apoplexy...
Paralysis...	2	...	...
Corea...
Epilepsy...	1	...	1	10	1	...	...	...	1	...	...	...
Neuralgia...	...	1	2	37	9	26	...	...	...	1	1	36	...	...
Hysteria...	1	...	1	18	...	...	...	...	...	...	...	...
Neurasthenia...	2	2	6	2	...	...	...	1	...	...	...
Other diseases	2	8	7	33	...	...	...	...	2	6	2	...
Mental Diseases:—														
Sub-section 3—														
Idiocy...
Mania...	2	...	1	...
Melancholia...	2	1	3	10	2	...	...	...	...	...	...	...
Dementia...
Delusional insanity	1	...	...	...	...	...	...	...
Other diseases	1	1	2	...	...	...	...	...	1	...	...
Diseases of the Eye:—														
Conjunctivitis...	15	2	12	...	...	...	...	...	12	...	...
Keratitis...	1	...	...	...	...	...	...	...	3	...	...
Ulceration of cornea	1	...	...
Iritis...	1	1	2	49	1	...	...	...	...	...	...	...
Optic neuritis...
Cataract...
Other diseases	1	3	2	8	...	...	...	...	1	10	4	...
Diseases of the Ear:—														
Inflammation...	19	2	10	...	...	...	...	...	7	...	...
Other diseases	14	1	...	...	...	...	...	...	4	...	...
Diseases of the Nose:—														
Inflammation...	1	24	9	34	...	...	...	...	...	19	...	...
Diseases of the Circulatory System:—														
Pericarditis...
Endocarditis...
Valvular (1) Mitral	1	...	1	17	1	...	...	...	2	...	1	...
(2) Aortic
(3) Tricuspid
(3) Pulmonary
Arterial sclerosis	1	4	1	3	...	...	...	...	...	...	...	...
Aneurism...	1	...	...	...
Other diseases	2	...	...
Diseases of the Respiratory System:—														
Laryngitis...	1	16	1	16	...	...	...	...	1	29	...	...
Bronchitis...	3	55	16	72	...	...	...	...	5	47	...	...
Broncho-pneumonia	1	1	1	...	...	...	...	...	...	...	...
Abscess of lung
Gangrene of lung
Emphysema
Pleurisy...	2	2	4	32	...	...	...	...	1	3	...	...
Empyema...	1	...	1	11	...	...	...	...	...	...	...	...
Other diseases	1	5	3	14	...	...	...	...	...	7	...	1
Diseases of the Digestive System:—														
Stomatitis...	1	8	2	4	...	...	...	...	1	10	...	...
Caries of teeth	4	13	4	7	...	...	...	...	5	8	...	...
Glossitis...	2	...	...	...	...	...	...	...	...	...	...
Sore throat...	2	15	3	11	...	...	...	...	1	7	...	...
Inflammation of tonsils	3	12	8	28	...	...	...	...	7	7	...	...
Gastritis...	11	45	36	174	...	...	...	...	19	29	2	...
Ulceration of stomach
Hæmatemesis
Dilatation of stomach
Stricture of stomach
Dyspepsia...	1	70	12	40	...	...	...	...	2	64	...	...
Enteritis...	4	20	18	67	...	...	...	...	1	2	...	1
Appendicitis	3	3	5	113	3	...	...	...	2	1	1	...
Colitis...	5	7	10	42	...	...	...	...	2	2	1	...
Ulceration of intestines	1	1	...	...	...	...	...	...	...	...	...
Sprue...

TABLE VII.—RETURN OF DISEASES AND DEATHS FOR THE YEAR 1914—*continued.*

DISEASES.	EUROPEANS.													
	GOVERNMENT OFFICIALS.										NON-OFFICIALS.			
	Remained from last year.		Admissions.		On sick list.		Invalided.	Deaths.	Remaining end of year.		Total under treatment.		Invalided.	Deaths.
	Intern.	Extern.	Intern.	Extern.	Number.	Total days.			Intern.	Extern.	Intern.	Extern.		
LOCAL DISEASES—continued:—														
Diseases of the Digestive System—continued:—														
Hernia	1	...	1	19	...	...	...	...	1	...	...	...
Diarrhoea	4	36	22	64	...	...	...	...	3	29	...	...
Constipation	1	54	9	8	...	...	...	...	3	85	...	...
Colic...	2	16	12	27	...	...	...	...	...	4	...	...
Hæmorrhoids	5	10	8	45	1	...	...	...	...	9	...	...
Pancreatitis
Hepatitis—acute	2	4	3	13	...	...	...	...	2	3	1	...
Abscess	1	1	2	29	1	...	...	...	...	...	...	...
Cirrhosis
Jaundice	1	2	1	10	...	...	...	...	4	4	1	...
Peritonitis	1	...	1	6	1	...	...	...	...	...	...	...
Ascites
Other diseases	1	1	1	7	1	...	...	...	1	5	...	...
Diseases of the Lymphatic System:—														
Splenitis	1	..	1	23	...	...	...	...	3	...	1	...
Inflammation of lymphatic gland	3	19	14	132	...	...	...	...	12	12	...	...
Suppuration of lymphatic gland...	2	2	4	113	...	...	...	...	2	11	...	...
Lymphangitis	2	2	7	...	...	...	...	...	...	...	...
Elephantiasis
Diseases of the Urinary System:—														
Acute nephritis	1	...	1	12	...	...	...	...	1	...	1	...
Bright's disease	1	...	...	...	...	...	...	...	1	...	...
Pyelitis
Calculus	3	2	7	1	...	...	...	...	...	...	...
Renal colic	1	2	2	5	18	...	...	...	...	...	...	...	...
Cystitis	1	1	2	4	1	...	...	...	...	...	...	...
Vesical calculus	1	...	1	9	1	...	...	...	...	...	...	...
Suppression...
Hæmaturia
Chyluria
Diseases of the Generative System:—														
Male Organs:—														
Urethritis	6	...	...	...	...	...	...	2	16	...	...
Gleet	3	...	...
Stricture
Prostatitis	1	...	...	...	...	...	...	1	2	1	...
Soft chancre	6	...	...	...	...	...	...	1	17	...	...
Condyloma
Inflammation of scrotum
Hydrocele
Orchitis	2	1	12	...	...	...	...	...	4	...	...
Epididymitis	1	5	6	23	...	...	...	2	...	1	...	...
Abscess of testicle	1	...	3	2	9	...	...	...	1	...	...	...	...
Other diseases	3	3	...	...
Female Organs:—														
Ovaritis
Ovarian cyst
Endometritis
Displacement of uterus...
Vaginitis...
Amenorrhœa
Dysmenorrhœa
Menorrhagia
Leucorrhœa
Abortion...
Delayed labour
Post-partum hæmorrhage
Retained placenta
Premature birth...
Puerperal septicæmia
Mastitis
Abscess of breast
Other diseases

TABLE VII.—RETURN OF DISEASES AND DEATHS FOR THE YEAR 1914—*continued.*

DISEASES.	EUROPEANS.													
	GOVERNMENT OFFICIALS.										NON-OFFICIALS.			
	Remained from last year.		Admissions.		On sick list.		Invalided.	Deaths.	Remaining end of year.		Total under treatment.		Invalided.	Deaths.
	Intern.	Extern.	Intern.	Extern.	Number.	Total days.			Intern.	Extern.	Intern.	Extern.		
LOCAL DISEASES—continued:—														
Diseases of Organs of Locomotion:—														
Osteitis	1	1	2	10	...	...	1	...	...	1	...	...
Arthritis	5	5	6	127	1	...	1	...	...	5	...	...
Spondylitis	4	4	...	...	...	...	...	...	...	...	...
Bursitis	1	4	3	29	...	...	...	...	...	...	...	...
Other diseases	1	1	3	...	...	...	...	...	3	...	...
Diseases of Connective Tissue:—														
Cellulitis	3	8	8	67	...	...	...	...	3	8	1	...
Abscess	4	12	7	94	...	...	1	...	6	7	1	...
Elephantiasis
Other diseases	2	...	...
Diseases of the Skin:—														
Urticaria	5	3	5	...	...	...	1	1	2	2	...	...
Eczema	1	23	4	6	...	...	...	...	2	33	...	...
Boil	8	59	22	151	2	...	3	...	11	27	...	...
Carbuncle
Herpes	3	...	...	...	...	...	...	...	2	...	...
Psoriasis	2	...	...	1	...	...	...	...	...	...	...
Oriental sore
Tinea	34	2	3	...	...	...	...	...	58	...	...
Scabies	2	...	...	...	...	...	...	...	14	...	...
Acne...	3	2	...	...	...	...	...	...	5	...	...
Prickly heat	12	...	...	...	...	...	...	...	13	...	...
Ulcers	1	31	11	79	1	...	...	...	3	30	...	...
Other diseases	11	3	7	...	...	...	...	...	16	...	...
INJURIES:—														
General	1	5	5	16	...	1	1	...	...	7	...	...
Local	1	20	55	44	321	1	...	...	1	13	86	2	...
Sunstroke	4	3	7	2	...	...	...	...	...	...	...
*Surgical Operations
Tumours
Papilloma	2	...	...
Malformations
Poisons	1	1	2	27	...	...	...	...	...	2	...	...
Ptomaine poisoning	1	...	...
Parasites—Animal	1	...	...	...	...	...	...	...	1	...	...
Protozoa
Trematoda (flukes)
Cestoda—
Tænia solium	1	...	...	...	...	...	...	...	2	...	...
Tænia saginata	1	...	...	...	...	...	...	...	...	...	...
Nematoda—
Ascaris	1	1	...	...	...	...	...	...	1	2	...	...
Tricocephalus dispar
Trichina
Dracunculus
Filariasis	2	...	...	...	...	...	...	...	...	...	...
Strongylus
Ankylostomiasis	1	...	...
Oxyuris
Insecta—
Myiasis	1	6	1	5	...	...	...	...	...	2	...	...
TOTAL	2	8	275	1,257	745	4,488	41	5	10	11	343	1,247	45	17

* Surgical operations are not included in the Total of Diseases; all such cases are recorded against their respective diseases.

TABLE VII.—RETURN OF DISEASES AND DEATHS FOR THE YEAR 1914—
continued.

DISEASES	NATIVES.								
	TOTAL NATIVE PATIENTS.					NATIVE OFFICIALS.			
	Remaining from last year (Intern.).	Admissions to		Deaths.	Remaining at end of year (Intern.).	Number on sick list.	Total days on sick list.	Invalided.	Deaths.
		Intern.	Extern.						
INFECTIVE DISEASES:—									
Beri-beri ... ..	...	225	2	5	8	...	...	...	...
Cerebro-spinal fever ... ..	...	...	...	...	...	...	...	...	...
Chicken-pox	22	354	133	6	26	6	66	...	...
Cholera ... ..	...	...	...	...	...	...	...	...	...
Dengue ... ..	...	...	...	...	...	...	...	...	...
Diphtheria ... ..	...	...	1	...	...	...	...	...	...
Dysentery	20	629	634	136	22	24	216	...	1
Endocarditis—infective ... ..	...	...	...	...	...	...	...	...	...
Enteric ... ..	...	2	...	...	...	2	40	...	...
Erysipelas ... ..	...	...	...	...	...	...	...	...	...
Gonorrhœa	11	118	1,422	1	5	13	48	...	...
Influenza ... ..	...	...	...	...	...	...	...	...	...
Kala Azar ... ..	...	...	...	...	...	...	...	...	...
Leprosy (a) Nodular	19	14	3	...	14	...	...	...	...
(b) Anæsthetic	43	152	17	4	36	...	...	...	...
Malaria (a) Tertian ... ..	...	...	...	...	...	...	...	...	...
(b) Quartan ... ..	...	1	3	...	...	...	...	...	...
(c) Acstivo-autumnal	12	438	4,074	4	7	253	979	...	...
(d) Chronic malaria ... ..	...	...	...	...	...	...	...	...	...
(e) Blackwater fever ... ..	...	1	1	1	...	1	25	...	...
Measles ... ..	...	6	33	...	...	2	7	...	...
Rubella ... ..	...	1	...	...	...	...	...	...	...
Plague ... ..	...	...	...	...	...	...	...	...	...
Pneumonia	13	207	116	49	5	7	76	1	...
Rabies ... ..	...	...	...	...	...	...	...	...	...
Relapsing fever ... ..	...	...	2	...	...	...	...	...	...
Rheumatic fever	2	116	24	3	...	...	...	...	...
Septicæmia ... ..	...	7	...	2	1	...	...	...	...
Pyæmia ... ..	...	1	...	...	...	...	...	...	...
Trypanosomiasis (sleeping sick- ness)	97	70	9	6	70	...	...	...	...
Small-pox ... ..	...	9	13	3	...	4	58	...	...
Syphilis (a) Primary	2	10	22	...	...	1	82	...	...
(b) Secondary	1	15	115	...	2	1	21	...	...
(c) Inherited	2	1	31	...	...	...	...	...	...
Tetanus	2	22	2	12	...	1	1	...	1
Tuberculosis	1	60	48	23	13	3	173	1	1
Whooping cough ... ..	...	2	53	1	1	...	...	...	...
Yaws ... ..	...	9	185	...	...	1	10	...	...
Yellow fever ... ..	...	...	...	...	...	...	...	...	...
Other diseases	1	5	2	...	...	...	...	...	...
INTOXICATIONS:—									
Alcoholism ... ..	...	4	8	...	...	...	...	...	...
Morphinism ... ..	...	...	...	...	...	...	...	...	...
Other diseases ... ..	...	2	1	...	...	...	...	...	...
GENERAL DISEASES:—									
Anæmia ... ..	...	56	1,205	10	16	64	238	...	...
Anæmia—Pernicious ... ..	...	2	1	1	1	...	...	...	...
Diabetes ... ..	...	1	1	...	...	...	...	...	...
Exophthalmic goitre ... ..	...	...	...	...	...	...	...	...	...
Gout... ..	...	...	2	...	...	...	...	...	...
Leucocythæmia ... ..	...	...	...	...	...	...	...	...	...
Hodgkin's disease ... ..	...	...	3	...	...	...	...	...	...
Myxœdema ... ..	...	...	...	...	...	...	...	...	...
Purpura ... ..	...	...	1	...	...	...	...	...	...
Rickets ... ..	...	1	6	1	...	...	...	...	...
Scurvy ... ..	...	...	1	...	...	...	...	...	...
Chronic rheumatism ... ..	...	217	4,314	4	8	96	468	1	...
Other diseases	4	1	13	...	...	...	...	...	...

TABLE VII.—RETURN OF DISEASES AND DEATHS FOR THE YEAR 1914—
continued.

DISEASES	NATIVES.								
	TOTAL NATIVE PATIENTS.				NATIVE OFFICIALS.				
	Remaining from last year (Intern.).	Admissions to		Deaths.	Remaining at end of year (Intern.).	Number on sick list.	Total days on sick list.	Invalided.	Deaths.
		Intern.	Extern.						
LOCAL DISEASES—									
Diseases of the Nervous System—									
Sub-section 1—									
Neuritis ... ..	...	8	63	1	3	...	...	...	...
Meningitis ... ..	...	5	...	4	...	...	...	...	...
Myelitis	1	...	1	1	...	1	31	...	...
Hydrocephalus ... ..	...	...	1	...	...	...	...	...	...
Encephalitis ... ..	...	...	...	...	...	...	...	...	...
Abscess of brain ... ..	...	...	1	...	...	...	...	...	...
Congestion of brain ... ..	...	1	...	1	...	...	...	...	...
Other diseases ... ..	...	5	50	3	...	2	16	...	...
Sub-section 2—									
Apoplexy ... ..	...	...	...	...	...	...	...	...	...
Paralysis	3	28	24	10	...	...	...	...	...
Corca ... ..	...	1	...	...	...	...	...	...	...
Epilepsy	2	16	40	1	5	2	7	...	...
Neuralgia ... ..	...	22	1,042	...	3	19	33	...	...
Hysteria ... ..	...	...	29	...	...	1	2	...	...
Other diseases	4	...	...	...	...	...	...	...	...
Mental diseases:—									
Sub-section 3—									
Idiocy	3	3	1	...	4	...	...	...	...
Mania	22	5	...	12	12	...	...	...	...
Melancholia	7	5	1	1	11	...	...	...	...
Dementia	21	6	4	1	22	...	...	...	...
Delusional insanity	14	8	...	5	8	1	...	...	...
Delirium... ..	...	1	...	...	...	...	...	...	...
Diseases of the Eye:—									
Conjunctivitis	3	59	1,893	...	5	24	158	...	...
Keratitis ... ..	...	6	173	...	...	1	3	...	...
Ulceration of cornea	2	8	46	...	...	...	...	...	...
Iritis ... ..	...	6	25	...	...	...	...	...	...
Optic neuritis ... ..	...	...	12	...	...	...	...	...	...
Cataract ... ..	...	10	14	...	1	1	30	...	...
Other diseases ... ..	...	18	62	...	...	1	5	...	...
Diseases of the Ear:—									
Inflammation ... ..	...	6	1,058	...	...	11	168	...	...
Other diseases ... ..	...	15	511	...	...	2	5	1	...
Diseases of the Nose ..	...	137	41	...	...	3	5	...	...
Diseases of the Circulatory System:—									
Pericarditis	1	3	6	3	...	...	...	...	...
Endocarditis ... ..	...	38	36	7	1	2	10	...	...
Valvular (1) Mitral	3	47	101	10	7	12	90	1	...
(2) Aortic	1	5	9	2	...	...	...	...	...
(3) Tricuspid ... ..	...	...	2	...	...	...	...	...	...
(4) Pulmonary ... ..	...	...	3	...	...	...	...	...	...
Arterial sclerosis ... ..	...	...	5	2	...	...	...	...	...
Aneurism	1	3	3	1	...	1	20	...	...
Other diseases ... ..	...	9	24	1	3	3	2	...	...
Diseases of the Respiratory System:—									
Laryngitis	1	10	328	10	6	14	49	...	...
Bronchitis	26	204	6,820	10	9	162	722	...	1
Broncho-pneumonia	2	22	26	11	...	...	...	...	...
Abscess of lung ... ..	...	1	4	2	...	...	...	...	...
Gangrene of lung ... ..	...	...	...	...	...	...	...	...	...
Emphysema ... ..	...	1	1	...	...	...	...	...	...
Pleurisy	11	73	171	8	9	4	65	...	...
Empyema ... ..	...	1	1	1	...	...	...	...	...
Other diseases ... ..	...	20	220	2	1	8	20	...	...
Diseases of the Digestive System:—									
Stomatitis ..	1	9	566	1	1	1	1	...	...
Caries of teeth ... ..	...	4	890	...	...	6	14	...	...
Glossitis ... ..	...	...	95	...	...	3	3	...	...
Sore throat ... ..	...	3	185	...	...	4	20	...	...
Inflammation of tonsils ... ..	...	8	292	...	...	10	38	...	...
Gastritis	3	32	487	...	...	17	46	...	...
Ulceration of stomach ... ..	...	...	...	...	...	...	...	...	...
Hæmatemesis ... ..	...	1	3	1	...	...	...	...	...
Dilatation of stomach ... ..	...	...	...	...	...	...	...	...	...

TABLE VII.—RETURN OF DISEASES AND DEATHS FOR THE YEAR 1914—
continued.

DISEASES.	NATIVES.								
	TOTAL NATIVE PATIENTS.					NATIVE OFFICIALS.			
	Remaining from last year (Intern.).	Admissions to		Deaths.	Remaining at end of year (Intern.).	Number on sick list.	Total days on sick list.	Invalided.	Deaths.
		Intern.	Extern.						
LOCAL DISEASES—continued :—									
Diseases of the Digestive System									
continued :—									
Stricture of stomach ... ..	...	...	...	...	...	...	...	...	...
Dyspepsia ... ..	...	12	1,302	...	1	22	38	...	...
Enteritis	1	23	177	4	...	14	67	1	...
Appendicitis ... ..	...	3	2	...	...	...	...	...	...
Colitis ... ..	...	14	13	2	3	4	64	...	...
Ulceration of intestines ... ..	...	...	...	...	...	...	...	...	...
Sprue ... ..	...	...	...	...	...	...	...	...	...
Hernia	12	200	167	6	9	7	144	...	...
Diarrhœa	14	576	2,051	46	31	61	190	...	...
Constipation ... ..	...	104	5,650	...	3	49	57	...	...
Colic... ..	...	81	1,137	2	5	17	40	...	...
Hæmorrhoids	8	29	215	1	2	13	136	...	...
Pancreatitis ... ..	...	...	...	...	...	...	...	...	...
Hepatitis—acute ... ..	...	13	45	3	...	3	45	...	...
Abscess	1	6	33	1	3	...	...	...	...
Cirrhosis ... ..	...	7	8	3	3	1	7	...	...
Jaundice ... ..	...	5	10	...	...	...	...	...	...
Peritonitis ... ..	...	12	3	4	2	1	...	...	...
Ascites	2	20	21	6	...	...	...	...	...
Other diseases	2	14	57	3	...	5	43	...	...
Diseases of the Lymphatic System :—									
Splenitis ... ..	...	13	178	1	...	1	6	...	...
Inflammation of lymphatic gland	10	111	755	2	4	17	139	...	...
Suppuration of lymphatic gland...	1	35	169	1	...	5	58	...	...
Lymphangitis ... ..	...	33	...	...	...	1	...	...	...
Elephantiasis	2	5	3	...	...	...	...	...	...
Other diseases ... ..	...	1	...	...	...	...	...	...	...
Diseases of the Urinary System :—									
Acute nephritis	1	28	43	7	7	6	72	1	1
Bright's disease ... ..	...	17	28	5	...	3	28	...	...
Pyelitis ... ..	...	1	1	1	...	1	7	...	1
Calculus ... ..	...	1	...	...	...	...	...	...	...
Renal colic... ..	...	1	15	...	...	...	...	...	...
Cystitis ... ..	...	2	62	...	...	2	13	...	...
Vesical calculus ... ..	...	...	2	...	...	...	...	...	...
Suppression ... ..	...	1	...	...	...	...	...	...	...
Hæmaturia... ..	1	3	13	...	...	2	12	...	...
Chyluria ... ..	...	...	...	...	...	...	...	...	...
Other diseases ... ..	...	1	10	1	...	...	...	...	...
Diseases of the Generative System :—									
Male Organs :—									
Urethritis ... ..	...	6	41	...	...	...	...	...	...
Gleet ... ..	...	2	22	...	...	...	...	...	...
Stricture	1	37	57	...	2	2	6	...	...
Prostatitis ... ..	...	...	4	...	...	...	...	...	...
Soft chancre	2	25	123	...	...	...	...	...	...
Condyloma... ..	...	...	7	...	...	...	...	...	...
Inflammation of scrotum...	...	3	14	...	...	...	...	...	...
Hydrocele	3	48	64	...	4	4	54	...	...
Orchitis	4	28	133	...	1	6	76	...	...
Epididymitis ... ..	...	8	27	...	...	4	43	...	...
Abcess of testicle ... ..	...	1	6	...	...	...	...	...	...
Other diseases	1	36	25	...	1	...	...	...	...
Female Organs :—									
Øvaritis ... ..	...	2	13	...	...	...	...	...	...
Ovarian cyst ... ..	...	2	4	...	...	...	...	...	...
Endometritis ... ..	...	8	98	1	...	...	...	...	...
Displacement of uterus ... ..	...	4	7	...	...	...	...	...	...
Vaginitis ... ..	...	2	11	...	...	...	...	...	...
Amenorrhœa ... ..	...	...	46	...	...	...	...	...	...
Dysmenorrhœa ... ..	...	2	103	...	...	...	...	...	...
Menorrhagia ... ..	...	...	24	...	...	...	...	...	...
Leucorrhœa ... ..	...	2	19	...	...	...	...	...	...
Abortion ... ..	...	...	14	...	...	...	...	...	...
Delayed labour ... ..	...	8	7	...	...	...	...	...	...

TABLE VII.—RETURN OF DISEASES AND DEATHS FOR THE YEAR 1914—
continued.

DISEASES.	NATIVES.								
	TOTAL NATIVE PATIENTS.				NATIVE OFFICIALS.				
	Remaining from last year (Intern.).	Admissions to		Deaths.	Remaining at end of year (Intern.).	Number on sick list.	Total days on sick list.	Invalided.	Deaths.
		Intern.	Extern.						
LOCAL DISEASES—continued :—									
Diseases of the Generative System (Female Organs)—continued—									
Postpartum hæmorrhage...	...	...	1	...	...	...	...	...	...
Retained placenta ...	...	2	...	...	...	...	...	...	...
Premature birth ...	...	1	...	...	...	...	...	...	...
Puerperal septicæmia ...	...	5	...	3	...	...	...	...	...
Mastitis ...	...	3	39	...	...	...	...	...	...
Abscess of breast ...	...	...	16	...	...	...	...	...	...
Other diseases ...	1	9	7	1	...	...	...	...	...
Diseases of organs of locomotion :—									
Osteitis ...	1	21	117	...	4	4	14	...	...
Arthritis ...	25	103	1,323	...	6	20	131	...	...
Spondylitis...	...	1	8	...	...	1	10	...	...
Bursitis ...	...	14	143	...	1	4	21	...	...
Other diseases ...	...	12	156	...	...	3	7	...	...
Diseases of Connective Tissue :—									
Cellulitis ...	5	178	770	5	3	9	126	...	...
Abscess ...	17	361	1,721	4	22	51	255	...	...
Elephantiasis ...	2	22	15	...	2	...	...	...	...
Other diseases ...	...	9	31	1	...	...	...	...	...
Diseases of the Skin :—									
Urticaria ...	...	1	109	...	...	...	...	...	...
Eczema ...	...	88	1,262	...	4	5	8	...	...
Boil ...	...	62	851	...	2	17	52	...	...
Carbuncle ...	...	...	4	...	...	...	...	...	...
Herpes ...	...	7	42	...	1	2	12	...	...
Psoriasis ...	...	8	14	...	...	...	...	...	...
Oriental sore ...	...	...	...	...	...	...	...	...	...
Tinea ...	...	12	1,640	...	1	6	12	...	...
Scabies ...	...	7	1,752	...	1	1	5	...	...
Acne ...	...	...	13	...	...	...	...	...	...
Prickly heat ...	...	1	70	...	...	...	...	...	...
Ulcers ...	17	296	8,785	3	40	15	95	...	...
Other diseases ...	1	18	408	2	1	4	31	...	...
INJURIES :—									
General ...	...	28	1,656	7	2	13	38	...	...
Local ...	39	694	9,940	15	9	43	362	...	...
Sunstroke ...	...	...	1	...	...	...	...	...	...
*Surgical operations ...	...	...	...	...	...	...	...	...	...
Tumours—Innocent ...	1	29	117	2	2	2	26	...	...
Malignant ...	...	10	2	...	...	...	...	...	...
Malformations ...	...	9	8	...	1	1	22	...	...
Poisons ...	...	12	23	1	...	...	...	...	...
Snake bite ...	...	1	3	...	...	...	...	...	...
Scorpion sting ...	...	...	9	...	...	...	...	...	...
Parasites—Animal ...	...	...	9	...	...	...	...	...	...
Protozoa ...	...	1	...	...	...	...	...	...	...
Trematoda (flukes) ...	...	...	3	...	...	...	...	...	...
Bilharzia ...	...	...	3	...	...	...	...	...	...
Cestoda—	...	...	...	...	...	...	...	...	...
<i>Tenia solium</i> ...	...	6	60	...	1	...	...	...	...
<i>Tenia saginata</i> ...	...	5	52	...	...	...	...	...	...
Nematoda—	...	...	...	...	...	...	...	...	...
<i>Ascaris</i>...	...	49	1,856	1	2	3	4	...	...
<i>Tricocephalus dispar</i> ...	...	1	14	...	...	...	...	...	...
<i>Trichina</i> ...	...	...	...	...	...	...	...	...	...
<i>Dracunculus</i> ...	13	110	522	...	14	13	176	...	...
Filariasis ...	...	7	23	...	2	2	11	...	...
<i>Strongylus</i> ...	...	...	...	...	...	...	...	...	...
Ankylostomiasis ...	2	220	112	9	17	3	33	...	...
<i>Oxyuris</i> ...	...	1	1	...	...	...	...	...	...
Other diseases...	...	1	...	1	...	...	...	...	...
Insecta—	...	...	...	...	...	...	...	...	...
Myiasis ...	...	...	16	...	...	...	...	...	...
Other diseases...	...	...	31	...	...	...	...	...	...
TOTAL ...	574	7,653	74,668	539	565	1,268	6,867	7	6

* Surgical operations are not included in the Total of Diseases ; all such cases are recorded against their respective diseases.

APPENDIX.

I.—ANNUAL REPORT, 1914, MEDICAL RESEARCH INSTITUTE.

Yellow fever.—Yellow fever investigation was carried on throughout the year as opportunity occurred and as material was forthcoming. As the results of this work have already been reported in full to the Yellow Fever (West Africa) Commission a synopsis will suffice here.

Experimental yellow fever in laboratory animals.—The transmission of yellow fever to laboratory animals was described in collaboration with Dr. Harald Seidelin. Some portion of the work was done in the latter part of 1913, but it was continued and finished in 1914.

Yellow fever in guinea-pigs.—Yellow fever was transmitted to guinea-pigs by means of direct subcutaneous or intraperitoneal injection of small amounts of diluted or undiluted blood from human cases of the disease. Further, the infection was kept up in a long series of guinea-pigs, from one animal to another, by the same direct means of inoculation.

Clinical signs of yellow fever in guinea-pigs.—A febrile illness followed the injection in the great majority of the animals. The incubation period was short, varying from a few hours to two days. The course of the illness varied. Sometimes the fever was acute, at other times of a chronic type, and death occurred in a considerable number, after an interval of days in some cases and in others after an interval of weeks. Collapse occasionally took place in the acute stages and was rarely recovered from. Progressive weakness, emaciation and staring fur were the other signs observed.

Albuminuria in guinea-pigs.—It was not found practicable to collect the urine during life, but animals were occasionally killed during some stage of the illness and the urine was examined at once before post-mortem changes had set in. Except in a few cases where the disease was at an early stage, albumen was always demonstrated in the urine.

Post-mortem signs of yellow fever in guinea-pigs.—The usual post-mortem signs of yellow fever were noted, hæmorrhages and erosions in the gastric mucous membrane, petechiæ in the pericardium and pleuræ, acute nephritis, and congestion of the liver. The urine in the bladder usually contained albumen.

Paraplasma flavigenum in guinea-pigs.—*Paraplasma flavigenum* was constantly found in the blood of the infected guinea-pigs, sometimes as early as 12 hours after inoculation. The bodies were found as a rule during the whole course of the illness and in the early days of convalescence.

“ Impression smears ” from the lungs, spleen and liver (made by lightly touching the slide with a freshly cut portion of the organ) frequently showed both extra and intra-corpuscular bodies, which were thought to be advanced forms of *Paraplasma flavigenum*, and which were called “ blue bodies.”

Blood cultures by Bass's and by Ziemann's methods.—Five attempts to cultivate the intra-corpuscular bodies which are found in yellow fever were made. Two of the samples of blood came from human cases and the others were obtained from infected guinea-pigs. Bass's technique was followed with one portion of the sample, and Ziemann's method with the other. On one occasion, a minute quantity of guinea-pig's bile was added to the blood, as well as dextrose. The results were negative in every instance, no evidence either of growth or of multiplication being observed.

Yellow fever in monkeys.—Two monkeys were inoculated from infected guinea-pigs. The febrile reaction was short and slight. *Paraplasma flavigenum* was found in the blood for a few days after the injection. A portion of spleen excised from one of the animals showed the “blue-bodies” also.

Mosquito experiments in yellow fever.—Various experiments with *Stegomyia fasciata* were carried out in conjunction with Dr. Seidelin and Mrs. Summers-Connal. Mosquito transmission of yellow fever was attempted from sick to healthy guinea-pigs in a few instances. Regular series of mosquitoes which had fed on infected guinea-pigs were dissected and all the organs examined both in the fresh state and after embedding. Observations on the feeding habits of *Stegomyia* in captivity were made. It was found that the female fed sometimes during the day, at other times during the night, and that they might feed for two or three successive days and refuse to bite for a day or two thereafter.

Observations on normal and on naturally infected guinea-pigs.—The natural diseases and the conditions found in apparently normal guinea-pigs were investigated with the assistance of Dr. Seidelin and Dr. J. E. L. Johnston, with a view to controlling the actual experimental work on yellow fever. It was found that bodies similar to *Paraplasma flavigenum* occurred in the red cells in a certain number of guinea-pigs. Such animals showed no fever and no signs of illness. Blood taken from them and injected into clean guinea-pigs did not give rise to febrile disturbance, although in a few cases the intracorpuseular bodies were afterwards found in the inoculated animals. A number of these “naturally infected” and also of the inoculated animals were killed. Albumen was never found in the urine. Small petechiæ were occasionally observed in the gastric mucous membrane, and some degree of congestion of the kidney or even nephritis was noted in a small number of cases. Some apparently healthy and normal guinea-pigs which died from unascertained causes showed petechiæ in the gastric mucous membrane, acute inflammatory conditions in the kidney and albuminuria.

Possible yellow fever in native children.—Dr. J. E. L. Johnston visited Abeokuta, a large inland native town, and remained there for some days examining native children and incidentally noting if guinea-pigs were kept in the compounds. The month was July. Thirty-five native children and adults were examined. Eighteen of these were infected with malaria and in addition three of them showed forms of the parasite similar to the *Plasmodium tenue* described by Stephens, one of these having a benign tertian and the other two having a subtertian infection. Twelve out of the 35 showed intracorpuseular bodies similar to *Paraplasma flavigenum*. There were no history or signs of illness in any of these 12 children. Sixty guinea-pigs were examined. Eighteen showed Paraplasma-like bodies, and three of these were five days old born in the same litter.

Reports of human cases of fever in Nigeria for transmission to the Commission.—Thirty-one case cards giving the temperature chart and brief notes of any interesting cases of fever, other than definitely diagnosed malaria, were received, arranged and forwarded to the Yellow Fever (West Africa) Commission. Nine came from Forcados, six from Burutu, five from Calabar, four from Lagos, two from Naraguta, and one each from Yola, Kano, Jebba, Ibadan and Onitsha. They included cases of definite or doubtful yellow fever, typhoid fever, meningitis and some unclassified febrile conditions.

Post-mortem specimens from cases reported to the Commission.—Seven specimens, each of liver, spleen and kidney, were microscopically examined and reported on, also three specimens of brain, two of myocardium and one each of salivary gland, bonemarrow, lung and stomach.

" Impression smears " from the organs of two cases (the lung and spleen in one, and the liver, kidney and spleen in the other) were examined. No parasites were seen.

Blood smears received from cases reported to the Commission.—Nineteen blood films from six cases were examined. Paraplasma-like bodies were found in five and in addition two of these showed subtertian malaria rings. A differential leucocyte count was made in all the films.

Possible yellow fever carriers.—During February, when two cases of yellow fever had been notified in Lagos, Dr. Craig took blood films from seven natives, all recording a temperature of about 100° F., living in the neighbourhood of the house from which one of the yellow fever patients had been removed. One of these harboured subtertian malaria parasites, and two others showed intracorpuseular Paraplasma-like bodies.

A number of cases were reported from time to time from Forcados. Dr. Booth took blood films from 11 adults and 10 children, most of whom were suffering from slight fever. Amongst these adults two were harbouring subtertian parasites and one the quartan parasite. Three quartan infections and two subtertian were found amongst the children, whilst one presented only pigmented mononuclears, and Paraplasma-like bodies were present in another. Dr. Braithwaite sent blood smears from 10 children at Abeokuta. All had some degree of fever, one had jaundice in addition, another had albuminuria, and the eyes were suffused in a third. Six of the children were proved to harbour the subtertian parasite, and Paraplasma-like bodies were found in other three.

Malaria blood films.—No systematic blood examination of the inhabitants of any particular area for a definite period has been made. At various times, however, collections of blood films have been sent in from certain districts.

Films showing malaria from Benin City.—The largest collection, 49 in all, was sent from Benin City by Dr. Jackson Moore. Blood smears from 10 children showed subtertian parasites in five and quartan in one. There was one subtertian infection and one quartan infection in 25 native adults. Films from 14 Europeans were examined, subtertian parasites being present in one. Pathological material was also received from a fatal case of subtertian malaria in a European.

Films showing malaria from Badagry.—Dr. Suffern sent blood smears from 45 children in this district. Only two of these showed no evidence of active or recent malaria. Quartan parasites were present in 22, and subtertian rings in nineteen. The smear from one child showed both subtertian and quartan parasites, and in another child, although no parasites were seen, pigmented mononuclear leucocytes were fairly numerous. Crescents were observed in seven of the cases of subtertian infection.

Films showing malaria from Forcados.—Thirty-two blood smears were received from Dr. Booth. Thirteen of the films were from children. A subtertian infection was found in five, quartan in three, and one child showed evidence of recent malaria, the large mononuclear leucocytes containing pigment. Crescents were present in two of the subtertian cases. There were blood films from 14 adult natives, quartan parasites being present in two and subtertian in one. Smears from five Europeans showed no parasites.

Films showing malaria from Lagos.—Twenty-seven smears were received from Lagos. There were six children amongst the cases, and two of these showed a subtertian infection. Smears from three adult natives were negative. Films from 18 Europeans were examined. Seven subtertian infections were found, one benign and quartan mixed, and another case showed only pigmented mononuclear leucocytes.

Films showing malaria from Brass.—Dr. Bate sent blood smears from 24 individuals. There were 17 children in the number, of whom seven suffered from subtertian, three from quartan, and one from both subtertian and quartan malaria. Crescents were seen in one of the subtertian cases. Smears from four adult natives were negative. Two subtertian infections were found in the films from three Europeans.

Films showing malaria from Warri.—Dr. Booth sent blood films from 16 children at Warri. Subtertian parasites occurred in five and quartan parasites in one.

Films showing malaria from Ibadan.—Blood smears from eight children were sent by Dr. Hungerford. Two of these showed a subtertian infection. Films from three adult natives showed quartan parasites in one. Dr. Neale sent smears from five Europeans, in two of which subtertian malaria was found.

Films showing malaria from Yaba.—The blood was examined in 11 adult natives, all of whom showed some rise of temperature or complained of body pains. Subtertian parasites were found in three, and one of these showed crescents. Three Europeans examined showed no malarial infection.

Films showing malaria from Aro.—Dr. Braithwaite forwarded blood films from 10 children. Subtertian parasites were present in six, and crescents occurred in one of these. One native adult and one European showed no signs of active or recent malarial infection.

Films showing malaria from odd cases.—Blood smears from two children at Owerri showed that one harboured quartan parasites. Two Europeans stationed with Div. II., North Eastern Railway, showed no evidence of malaria. Three Europeans—one at Baro, another at Kano and a third at Zungeru—were also negative. One European at Onitsha was infected with the subtertian parasite.

Pathological specimens in fatal malaria.—Specimens of various organs from three fatal cases indicated that subtertian malaria was the cause of death in three Europeans. These cases were reported from Burutu, Opobo and Benin City.

Bass cultures of the subtertian parasite No. 1.—The subtertian parasite was successfully cultivated on four occasions. Case No. 1 was from an adult native (the messenger attached to the Institute). He complained of shivering and vague pains. The temperature was 101.8° F. The blood showed numerous young rings of subtertian malaria. Ten c.c. of blood were withdrawn, placed in a tube containing $\frac{1}{10}$ c. 50 per cent. dextrose, and then defibrinated. The clot was removed, the fluid placed in three centrifuge tubes and incubated at 37° C. Smears were not made until 18 hours afterwards, when numerous small ring forms, pear shaped forms and equatorial forms were seen. In 20 hours all the forms had become rounded and compact with the chromatin faintly staining. After 22 hours' incubation, the parasites filled half of the cell, auto-erythrophagocytosis was marked and a fair number of parasites were seen inside the mononuclear leucocytes. At 24 hours, the forms were distinctly larger and pigment was observable in scattered grains throughout the protoplasm. After 28 hours the pigment was grouped in the middle of the parasite, and more than half of the host cell was occupied. At 42 hours the chromatin had begun to break up and most of the parasites were in the pre-rosette stage. After 44 hours, many complete rosettes were present, others had liberated their spores and a few very young forms were seen inside the red cells. Some mononuclear leucocytes were observed to contain complete rosettes. Auto-erythrophagocytosis was well marked and there was much free and ingested pigment. It must be recorded that at each examination a certain number of parasites were noted which did not seem

to keep pace with the majority in rate of growth. At the time when most of the parasites were in the rosette stage these others hardly occupied half the cell, the chromatin was scanty and the protoplasm rather faintly stained. It was concluded that these were sexual forms. At 50 hours the smears showed only young rings and these supposed sexual forms. At 68 hours crescents were noted. With regard to the patient himself, the temperature was normal after 24 hours, and did not rise again. Parasites were not found in the blood again until the fourth day, when a few crescents were seen. He was not given any quinine.

Bass culture No 2.—Case No. 2 was from an adult male leper in the neighbouring asylum. He complained of headache and “itching” over his body. The temperature was 100.4° F. Small subtertian rings were fairly numerous in the blood. The same procedure for cultivation was followed as in Case No. 1, but some tubes were kept at room temperature (21° C.—30° C.), and others were incubated at 40° C. It may be said at once that no appreciable differences were observed in the rate of growth of the parasites in the two sets of tubes. After 4 hours’ incubation numerous ring, pear-shaped and spherical forms were present. After 6 hours, although a few rings were still present, most of the parasites were in the form of spheres, and pigment was observable in their protoplasm. At 8 hours, the rings had become small spheres, but most of the parasites which were in the form of spheres at 6 hours were now fairly large, occupying about half of the cell and with the pigment aggregated at one spot. The chromatin stained faintly and was scattered. At 16 hours there were still a few small ring forms and some half-grown spheres, but most of the parasites were almost full grown, with the chromatin staining very distinctly. After 18 hours’ incubation rosettes were present, and some mononuclear leucocytes were seen to have ingested erythrocytes. At 20 hours all stages were seen from small rings to sporulating bodies, and phagocytosis of parasites by the mononuclear leucocytes was well marked. Thereafter the cultures were examined at short intervals up to 118 hours. A few of the second generation developed to rosettes at 52 hours, but they were smaller than the first; phagocytosis of the parasites was a marked feature and the smaller spheres with slower growth than the others progressed, but did not, as was observed in Case No. 1, develop as far as the crescent stage. The patient himself showed a normal temperature on the second day, but the parasites had not disappeared from his blood until the third day, when many pigmented mononuclear leucocytes and one phagocytosed ring parasite were seen. He was not given any quinine.

Bass culture No. 3.—Case No. 3 was from a European mate on an intermediate steamer. He was in his fourth day of illness. The temperature had been 106° F. on the third day. On the fourth day it was 101° F., albuminuria was present, there were frontal headache, suffused eyes, earache, and frequent and distressing vomiting. Numerous subtertian rings were present in the peripheral blood. On this occasion some tubes of the blood were cultivated at 40° C., others at 36° C., and others again at room temperature (21° C.—30° C.). After 5 hours’ incubation the rings were distinctly larger and the vacuole had practically disappeared, and a few fine granules of pigment were present. At 7 hours the parasites were more elongated, the chromatin was faintly stained and the pigment showed signs of grouping. After 9 hours the parasites had mostly returned to the spherical shape and filled nearly half the host cell. In 16 hours growth was still more advanced and the chromatin was more distinct. It was at this time that the same two types of parasite became noticeable, the one small and compact and slow growing, presumably the sexual form, and the other larger and more actively growing, the asexual or segmenting form. At 19 and 21 hours, all stages from half grown parasites (sexual) to large forms in the pre-segmenting stage were present. At 23 hours well marked rosettes were found containing 6 to 8 spores. At 25 hours the spores had further subdivided and numbered from 24 to 32 in most cases. At

27 hours most of the sporulating bodies had ruptured, many red cells contained young rings and a fair number of the sexual forms were seen. No auto-erythrophagocytosis was observed, nor phagocytosis of the parasites. From this time up to 89 hours no further evidence of growth was observed, and degeneration of the parasites proceeded rapidly. This patient had had an intramuscular injection of quinine on the third day of his illness.

Bass culture No. 4.—Case No. 4 was from an adult male leper. He complained of vague and slight body pains. The temperature was 98.8° F. The blood showed scanty subtertian rings. On this occasion one set of tubes was incubated at 39° C., another at 34° C., and a third at room temperature (21° C.–30° C.). After 3 hours' incubation, the rings were larger. After 6 hours the vacuole had disappeared and grains of pigment were observable. At 9 hours the spherical parasites occupied more than half of the host cell and at 14 the pigment was definitely collected into an irregular mass. At 19 hours most of the parasites appeared to be full grown, and in some the chromatin was dividing. At 22 hours the division of the chromatin had increased, and after 23 hours rosettes were present. The same two types were observed as in the other experiments—the sexual and the asexual forms. After 26 hours most of the sporulating bodies had burst and there were numerous spores, both free and in the red cells. It was at this time that it was observed that in the tubes incubated at 34° C. and in those kept at room temperature the average size of the sexual parasites was smaller than in the tubes incubated at 39° C. After 33 hours, auto-erythrophagocytosis and phagocytosis of the parasites was noticeable. After 42 hours degeneration was observable in most of the parasites. After 47 hours, a few fresh rosettes were present. These probably proceeded from some of the slower growing parasites which were thought to be gametocytes. At 55 hours all the parasites were more or less degenerated, more so in the tubes incubated at 39° C. than in the others, and similar conditions were found at 68 and 99 hours. No crescents were seen. The patient himself showed a few parasites in the peripheral blood up till the third day, and also auto-erythrophagocytosis, but the temperature remained normal. He received no quinine.

Comparison of the cultures.—The parasite was of the same species in all four cases. Ingestion of red cells and of parasites (at all stages) by the large mononuclear leucocytes was a marked feature in the cultures from the three natives, and was conspicuously absent from the culture of the European blood. No quinine had been administered to the natives. The marked agglutination of the sporulating bodies described by J. G. and D. Thomson (*Annals of Tropical Medicine and Parasitology*, Vol. VII., No. 4, December, 1913, pp. 509-524) was not observed in the three cultures from the natives, but there was a slight tendency to agglutination in the case of the European.

Indications from Bass cultures.—Ordinary room temperature in this part of the tropics is apparently quite suitable for the growth of the parasite by Bass's method of cultivation, when the tubes are kept in the dark. The occurrence of phagocytic phenomena in the cultures from all three natives, and the absence of these phenomena in the culture from the European support the contention that the adult native has some degree of immunity to malarial infection. This partial immunity enables him at times to recover from the infection without the use of quinine. All three natives have been under observation for over six months since their attack, and no relapse or reinfection has followed. The statement by J. G. and D. Thomson in the paper above alluded to, that the pigment in subtertian parasites (*Plasmodium falciparum*) collects into a definite mass at an early stage of growth, is confirmed by the results obtained at the Institute.

The appearance of crescents in the culture tubes has apparently not been previously described, and but slight reference has been made in the literature to the marked phagocytic phenomena which were noted in the present cases.

The value of Bass cultures in a negative diagnosis.—The blood of two other natives was cultivated by Bass's method. Both of these individuals were suffering from febrile disturbance, headache and muscular pains. No parasites were seen at any time in the smears made from the cultures, and it was concluded that the fever was due to some cause other than malaria.

Monkey malaria.—Three young monkeys, at the beginning of the year, were found to harbour malarial parasites. A short note was written, in collaboration with Dr. Seidelin, and it was published in the *Annals of Tropical Medicine and Parasitology*, Vol. VIII., No. 1, April, 1914, pp. 81–82. The noteworthy features were that the parasites were scarce and that the majority of the forms were gametocytes. The pigment in the fresh state was bright yellow in colour; stained by Giemsa's method it had a brilliant green appearance. Thereafter 14 other monkeys were received at the Institute, but only one of these showed parasites (*Plasmodium*, Sp. ?).

Bass cultures of monkey malaria, first experiment.—The outstanding feature of the infection in all four monkeys was that after repeated examination no parasites undergoing schizogony were seen. In fact very few forms intermediate between small ring parasites and full grown gametocytes were observed. From what is known of the life cycle of the human *Plasmodia*, either schizogony or parthenogenesis was taking place in the internal organs. Monkey No. 353 showed the largest number of parasites in the peripheral blood, and accordingly cultures were made both by the Bass and the Ziemann method from this animal. For the latter method, goat's serum inactivated for one hour at 45° C. was used, and the leucocytes were removed by means of the centrifuge. Both sets of cultures were incubated at 38° C. No difference in the appearance of the parasites or in the rate of growth was observed in the two methods. After 8 hours' incubation ring forms and gametocytes and what were apparently gametes were observed, but remarkably few forms intermediate between these extremes were observed. The appearances were similar after 13 hours, 18 hours, 23 hours, 28 hours and 33 hours. At 38 hours the gametocytes were fewer than previously, but again at 43 hours they were numerous; young forms were also numerous at that time, but after 48 hours only a few rings were seen and gametocytes and gametes predominated. At 61 hours and 85 hours only gametes and gametocytes were found. At 94 hours, one young form with two chromatin dots was seen in addition to numerous gametocytes. Thereafter at 101, 111, 115, 121, 131, 137, 146, 157, 163, 169, 179, 185 and 195 hours, young forms were not again seen, and the gametes and gametocytes became progressively fewer in number. It will be seen that young ring forms were constantly present up till 48 hours' incubation, when they disappeared rapidly. There were never sufficient intermediate forms to account for the growth of the parasites up to the gametocyte stage, and the conclusion seems unavoidable that growth did not take place to any marked extent. Yet the parasites were remarkably fresh and active throughout the first three days. No phagocytic phenomena were observed in the Bass cultures.

Bass cultures of monkey malaria, second experiment.—The second experiment was made six months after the first. During that interval the monkey had undergone an eight days' course of intramuscular injection of quinine. This treatment had somewhat reduced the number of parasites at the time, but they became as numerous as ever shortly afterwards. Three and a half months elapsed between the quinine administration and the second experiment. Bass's method only was followed on this occasion, but the leucocytes were removed from one set of tubes and allowed to remain in the other. The incubation temperature was 40° C. No difference was observed in the parasites in the smears from the two sets of tubes. After 4 hours' incubation most of the parasites were full-grown or nearly so, and both the large mononuclear and the polymorphonuclear leucocytes contained a good deal of

pigment. At 8 hours young forms, including rings, were more numerous again. At 12 hours the gametes and gametocytes still preponderated in number but there were numerous younger parasites. Many gametes appeared to be very active, throwing out pseudopodia. At 20 hours, 24 hours, 28, 32, 36, and 44 hours the appearances were still similar, but at 48 hours young forms were again more numerous. At 53, 58 and 69 hours the full grown forms once more predominated. On this occasion, thus differing from the first experiment, all stages of growth of the parasite were seen, and were in fair number, but as in the first experiment no trace of division of the parasites was seen.

These results, incomplete and inconclusive as they are, are given for the purposes of the Annual Report of work done.

Mosquito experiments with monkey malaria.—*Stegomyia fasciata*, *Culisomyia nebulosa*, *Ochlerotatus irritans*, *O. nigricephalus* and *Anopheles costalis* were all used in feeding experiments in an attempt to find the insect host of monkey malaria. All these insects fed, *Stegomyia* and *Anopheles* with avidity and the others with difficulty. At regular intervals after feeding a certain number were dissected and others made to feed on clean monkeys. No success was obtained. No developmental forms were ever found in the organs of the mosquito, and the clean monkeys did not become infected.

Effect of quinine on monkey malaria.—Monkey 404, a young *Cercopithecus* Sp.? showed a few gametocytes in the blood on 8th March, 1913. Half a grain of quinine hydrochloride was injected intramuscularly each day for eight days thereafter. On the ninth and tenth days the dose was increased to 1 grain and on the tenth day 2 grains were given. A few gametocytes were present on 11th March and on 16th March, but no parasites were seen on 20th March, that is after the animal had received 6 grains of quinine, but on 30th March the gametocytes reappeared.

Monkey 353, a large *Papio sphinx*, showing numerous rings and gametocytes in the blood, received quinine hydrochloride intramuscularly in the following doses: 15th April, 1 grain, ditto 16th April, $\frac{1}{2}$ grain 17th April, 2 grains 20th April, 1 grain 21st April, and $2\frac{1}{2}$ grains 23rd April; 8 grains in all, during a period of nine days. The parasites became fewer in number during the treatment, but shortly afterwards they were as numerous as ever.

Blackwater fever.—This disease forms the subject of a separate report. Blood smears from six cases were received. In three of these cases, two at Ibadan and one at Onitsha, the films were taken during the first day of the hæmoglobinuria, and subtertian parasites were found in all three. Of the remainder, the blood was examined on the second day in two and on the third day in one, and parasites were not found in any of these. Specimens from two fatal cases were received. The usual signs of the disease were found in the organs.

Ulceration of the fauces in blackwater fever.—Dr. Neale reported an unusual complication in blackwater fever at Ibadan. In three consecutive cases of the disease, he noticed an ulcerated condition of the fauces, foul smelling and acute. The parts involved were at the base of the anterior pillars of the fauces. The ulceration was deep and tended to spread rapidly. The systemic disturbance appeared to be profound, and the condition seriously prejudiced the patients' chances of recovery. Smears and cultures made from the ulcer, in the third case of the series, showed *Staphylococcus albus* and *citreus*, the *Pneumococcus* and various yeasts.

Dysentery.—Specimens of the fæces from 14 cases of amœbic dysentery were examined. Three of the specimens were from Europeans, and all

three showed *Entamoebæ*, free and encysted, along with numerous pus cells and red blood corpuscles. In a specimen of the fæces from a fourth European who had been under treatment for some weeks with emetine, no amœbæ were found. Dr. Gibson sent samples of the fæces from 14 native prisoners, all of whom suffered from diarrhœa. Amœbæ, pus cells and erythrocytes were observed in 11 of these.

Flagellated protozoa were found in the fæces of two natives, one sent from Baro, the other occurring at Yaba. Diarrhœa of a somewhat mild type was present in both cases. Some pus cells, but no red blood corpuscles, were seen in the smears. The flagellates themselves were active, and they appeared to possess three cilia at the blunt end of their pear-shaped body. The material was insufficient for a definite identification.

Sputum from a case of liver abscess which had ruptured into the lung was examined.

Specimens of fæces from six natives at Benin City and from 10 natives at Ebute Metta showed no *Entamoeba tetragena*.

Dysentery in cats.—Dysentery in two cats was investigated. One animal died, the other recovered. No amœbæ were found in the stools of either. The cat which died came from a house where several cases of dysentery amongst Europeans had occurred some weeks previously. Post-mortem: there was no ulceration of the large intestine, but the mucous membrane was pink, soft and spongy.

Dysentery in goats.—An epidemic of dysentery amongst goats occurred at Yaba. Seven animals died after an illness of a few days, during which the motions were frequent and contained much blood and mucous. Numerous active flagellates were present. They resembled *Trichomonas*.

Trypanosomiasis.—Blood smears from three cases of human trypanosomiasis were examined. One of the cases was in a European and the other two in natives. Trypanosomes of the *gambiense* type were present in all. One of the native cases was fatal, and the brain showed the typical signs of the disease, microscopically. The other native was one of the servants attached to the Institute. He complained of fever one evening, and a blood film made at the time showed numerous trypanosomes. He was given 2 grains of atoxyl, and decamped on the following day.

Trypanosomiasis in pigs.—Blood smears from 126 pigs have been sent in from various stations, *T. pecorum* was found in 12 of these. Eight infected animals came out of 46 from the Aro District (Aro, Itori, Owowo and Abeokuta), at all of which places there are stations of the Nigerian Railway. Three out of 13 pigs were infected at Ifon (Benin City district), Central Province. Smears from seven pigs at Ikot Ekpene were received, and one showed trypanosome infection (Eastern Province). Smears from 14 pigs at Benin City, 10 at Ibadan, 10 at Forcados, eight at Wasimi, six at Opobo, six at Calabar and six at Badagry were negative.

Trypanosomiasis in dogs.—Blood films from 22 dogs have been examined. Seven of the animals proved to be infected with a trypanosome of the *brucei* type. Three of these infected dogs (out of 11) came from Lagos, three from Benin City and one from Itu. Five from Aro and two from Ibadan showed no trypanosomes. Post-mortem material from another dog, at Afikpo, was received at the Institute. The results of the microscopical examination pointed to a diagnosis of trypanosomiasis.

Trypanosomiasis in cattle.—Trypanosome infection appears to be very common in cattle. Messrs. Miller Brothers, Ltd., brought a large herd of cattle down to Lagos from the Northern Provinces. A number died on the

journey, and when the remainder arrived in Lagos deaths became very numerous. The firm kindly handed over what was left of the herd (54 animals) to the Institute, with a view to finding the nature of the illness and to taking remedial measures. Trypanosomes (*T. vivax*) were present in 44, and 15 of these harboured babesia in addition. The disease was too far advanced for successful treatment, and all the animals died within a few weeks. The following account gives the details of the treatment of three of the animals, with atoxyl and salvarsan. Two of these were found to harbour trypanosomes alone, the other babesia in addition. The latter, 42A, was given an intravenous injection of 606 (grms. 6), followed six days later by a similar dose. After the first (12th November) the temperature rose the same evening from 101.6° to 103.4° F., falling the following morning to 101.7° F., remaining constant thereafter till the morning of the fourth day, when it rose to 103.2° F., gradually falling again to 101.6° F., when the second dose was given. On this occasion there was a fall in the evening temperature to 100.6° F., and thereafter a morning temperature of 101° F. and an evening of 100° F., until the evening of the fifth day (since the second dose), when it suddenly rose from 101.6° to 103.2° F., after which the temperature became more irregular, generally showing an evening rise of 1 or more degrees. The supply of salvarsan being limited, no further treatment was carried out, and the animal died on the 7th December, that is, 25 days after treatment was first commenced. The blood was examined on the morning of the 12th November, when trypanosomes and babesia were present in large numbers. The following morning there was a marked decrease in the numbers of both parasites, especially so in the babesia. It was not till the 15th November (Temp. 103.6° F.) that the trypanosomes again began to increase. An increase in the babesia was scarcely noticeable on the 18th November, the day after the second intravenous, there was again a marked decrease in the parasites. As before, the decrease was more noticeable in the babesia, the decrease in both being more marked than after the first intravenous injection. The improvement continued till the 21st November, when the evening temperature rose from 101.6° to 103.2° F. The next morning the temperature was 102° F., the trypanosomes were again found to be increasing, and no great difference was noted in the number of the babesia. The day before the animal died the blood showed a large number of trypanosomes and relatively few babesia. Throughout the treatment the number of trypanosomes was never so numerous as before this was commenced, whereas the number of babesia after the second intravenous injection steadily decreased.

The two other cases (41A and 43A) were treated with atoxyl. No. 41A was given 9 grs. of atoxyl on four different occasions, namely, the 9th, 14th, 20th and 25th November. After the first dose the temperature showed no variation until the evening of the 11th, when it rose from 101.2° to 104.6° F. On the 14th the morning temperature had fallen to 100.4° F., rising the same evening to 103.2° F.; after this, up to the 19th, the evening temperature remained lower than the morning. On the 20th November the third dose was given, the evening temperature rising from 101° to 102.4° F.

The following daily temperatures up to the 23rd November show an evening rise above that of the morning. The temperature after the last dose, given on the 25th, showed an evening rise from 101° to 102.2° F. From this day up to the time of death (30th November) the evening temperature remained higher than the morning.

In this case there was no marked diminution of the parasites till after the third dose. This was administered on the 20th November. On the following day a marked lessening in their number was noticed for the first time. This improvement did not continue. On the 25th November (when the last dose was given) the parasites were again increasing. On the 27th the animal was unable to rise after lying down, and on the 30th November death occurred.

The last blood film showed a larger number of trypanosomes than the one taken before treatment was commenced, No. 43A. On 14th November 20 c.c. of serum, previously removed from No. 41A, and heated for 1 hour at 45° C., was administered intravenously, followed shortly after by 8 grs. of atoxyl. The evening temperature was practically the same as the morning, that is 102° F. After this it gradually rose to 104° F. on the 15th November, again falling to 103·6° F. on the morning of the 17th, with a sudden evening drop to 99·4° F. It remained at 100° F. on the 18th November, and on the day following 102·4° F., when 8 grs. of atoxyl were given, the temperature rising the same evening to 103·4° F. and again 103° F. on the following morning. Thereafter till death, on the 24th November, the morning temperature remained on an average at 101° F., with an evening rise of 2 or 3 degrees.

The effect of the serum on the trypanosomes was to increase their numbers, which remained high till after the second dose of atoxyl, when there was a slight decrease in numbers on the following day. The animal was however in a very weak state and was unable to rise after the 22nd. Just before death the parasites had again increased, the numbers being in excess of those found previous to the treatment.

In these experiments all the animals were in a very weak state, their blood swarming with parasites. It was therefore hardly likely that recovery could be expected as a result of treatment. Blood smears from two bullocks at Abakaliki were examined and both showed an infection with *T. vivax*.

Ten goats, one ram and one horse showed no trypanosomes in the blood.

Ankylostomiasis.—It is possible that Ankylostomiasis in the sense of a grave and often fatal illness exists in West Africa to a greater extent than is generally known. Dr. G. E. H. Le Fanu believes from his own experience that many fatal cases occur, and that the disease presents an important problem to the sanitarian. It is certain that a very large percentage of the natives harbour ankylostomes, and also that Europeans not infrequently become infected. The adult worm can be found in most cases in the post-mortem room, and the ova can be seen in most samples of faeces. Specimens of the faeces from 10 native police constables at Ebute-Metta were examined. Ankylostome ova were present in all. Smears from the faeces of 10 natives at Benin City were examined (the smears were dry and the material was scanty), and ankylostome ova were found in six. Thirty of the inmates of the Lunatic Asylum at Yaba were examined, and 27 were proved to harbour ankylostomes.

Dr. Hungerford sent from Ibadan a specimen of faeces from a native showing ankylostome ova, from which the embryos had hatched within an hour after defaecation.

Dr. Booth sent a collection of adult ankylostomes from a native at Warri.

Filariasis.—All the blood smears which have been previously noted as having been searched for malarial parasites were also examined for filarial embryos. They were all thin films, and probably filarial embryos would have been observed more frequently had the films been thick. Seven cases of *Loa loa* infection in natives and one in a European were found from Benin City, and also one case showing embryos of *Acanthocheilonema perstans*. From Forcados, one case showed *Loa loa* embryos, another *Acanthocheilonema perstans* embryos, and a third was infected with both these filaria. All three were natives. Two adult natives at Yaba and one at Ibadan were the hosts of *Acanthocheilonema perstans*.

Typhoid fever.—Nine Widal reactions were done during the year, but only one gave a positive reaction. This case came from Forcados. There was a case-card and history of another possible case of typhoid fever in that town, the patient being a native. Post-mortem specimens were received from a fatal case in a native at Kaduna.

Each sample of blood sent to the Institute for the Widal reaction was put up in varying dilutions, with *B. typhosus*, *B. paratyphosus A.*, *B. paratyphosus B.*, and *M. melitensis*.

Syphilis.—The Wassermann reaction was done in six cases, all of which were positive. Smears from 21 hard sores were examined, and the *Treponema pallidum* was found in 13. The other pathological material examined included smears from multiple sores in a native, which were negative, and smears from a rupoid eruption, which were also negative, but in this case a Wassermann reaction was positive. A piece of tissue from an ulcer on the leg showed signs of a syphilitic origin, and post-mortem material from a native showed chronic cirrhosis of the liver and a gummatous pericarditis.

Gonorrhœa.—Smears from the urethral discharge in eight cases were examined, and gonococci were found in all. A vaccine was made for two of the cases.

Tuberculosis.—Seven specimens of sputum were examined for tubercle bacilli. The finding was positive in one European and two natives from Lagos, and negative in four natives, two from Brass and two from Lagos. Post-mortem material was obtained from four native cases, three in Lagos and one in Forcados. Two of the Lagos natives showed a general miliary tuberculosis. The third case in Lagos was in a Krooboy who had been steadily at work up till the day of his death. At the post-mortem very advanced *Phthisis pulmonalis* was found, with large cavities in the lungs. Dr. Sapara, who performed the autopsy, remarked on the endurance and lack of complaint which the Krooboy had shown. The case at Forcados was one of tubercular meningitis. Tubercle bacilli were found in the cerebrospinal fluid.

Tubercle bacilli were also obtained from the tonsils in a native case in Lagos, where there were cervical adenitis and enlarged tonsils.

Skin diseases, abscesses, etc.—Smears and an agar culture were sent from two cases of pustular eczema in Europeans. *Staphylococcus albus* was found and a vaccine was made. From another case of boils, *Staphylococcus pyogenes* was found and a vaccine was prepared. Two pieces of skin tissue were examined, one from a chronic eczema and the other from the edge of an ulcer. Syphilis was negatived in the former and malignancy in the latter.

Pus from a sloughing wound in the hand was examined for the tetanus bacillus with negative result.

Throat Condition.—The throat condition found in a case of blackwater fever has already been referred to, as has also been the finding of the tubercle bacillus from the tonsils in a native in Lagos.

A throat swab from a case of membranous exudate very like diphtheria clinically was received from Kano. A few diphtheroid bacilli were observed in the smear, but a serum agar culture was inconclusive. A guinea-pig was intraperitoneally inoculated with a broth culture of the short bacilli grown on the serum agar. The animal died in four days, and at the post-mortem there was general œdema, excess of fluid in the peritoneum, petechiæ in pleuræ and peritoneum, and intense hæmorrhagic congestion of the adrenals. Sections of the kidney showed intense nephritis. Cultures from the heart blood and from the adrenals were negative and cocci were isolated from the peritoneal fluid.

Another guinea-pig inoculated in the palpebral conjunctivæ showed no reaction.

Sections of the original membranous exudate showed no gram positive bacilli.

Tumours.—The complete tumour mass or portions of it were sent from 14 cases. These were all from natives. They included a fibroma (finger), a fibro-chondro-adenoma (cheek), and a rodent ulcer (face). There were three sarcomas from the foot, a fibro-sarcoma, a spindle-celled sarcoma and a melanotic sarcoma. There were three scirrhus cancers, one from the testicle, one from the male breast and one from the female breast. The other tumours were a sarcoma of the kidney, an osteo-sarcoma (pelvis), an alveolar sarcoma (axillary lymph gland), a spindle-celled sarcoma from the calf of the leg, and a round-celled sarcoma in the posterior abdominal wall.

Urine analysis.—Two samples of urine were received from a European who suffered from cystitis. The infection was due to *B. coli*. Three samples of urine were obtained from a European who exhibited hæmoglobinuria after quinine, but no other signs or symptoms, so that the condition could not be called blackwater fever.

Estimations of the amount of sugar in six samples of urine were made. Three other specimens of urine showed only albumen and another was normal.

Poisoning.—Two samples for analysis were received. One was from the scrapings of a soup pot, the contents of which were suspected of being poisoned. The other specimen was from the stomach contents, in a fatal case. No poisonous alkaloids were found in either case.

Post-mortem material from various sources.—Pieces of the liver from a native were forwarded to the Institute. They contained encysted *Porocephalus* larvæ. They apparently had no influence as a cause of death. The case occurred at Ibadan. Specimens from a fatal case of measles with hyperpyrexia were received from Forcados. The spleen showed intense hæmorrhagic congestion, the kidneys were the seat of acute nephritis and the brain showed great engorgement of the capillaries. Material from two cases of general arterio-sclerosis, one of pyæmia, one of sunstroke, one of lobar pneumonia and one of broncho-pneumonia were examined. Specimens were also received from a case which might have been ankylostomiasis, and from another case in which ascites was a prominent feature and the liver and spleen were found to be densely adherent.

Babesiasis.—All the animal blood smears which were examined for trypanosomes were also searched for babesiæ. One dog and one bullock from Lagos showed babesia (*B. canis* and *T. parva*) and one pig from Aro (*B. Sp?*).

Dr. Johnston carried out an investigation on babesiasis in cattle, and his notes are given here :—

“ During a recent tour in the neighbourhood of Kaduna, N. Nigeria, I obtained 150 films from cattle, and 12 from sheep.

“ Of the latter, one showed a bacillary-shaped babesia. Of the former, babesiæ were to be seen in no less than 39, or 26 % of the whole. These were of various types, many of which strongly resembled the various forms of *Paraplasma*.

“ Some were large, pyriform bodies, often with two chromatin dots, or several minute chromatin granules; some were fairly large rings, with well-marked chromatin, often the rings were extremely minute. Occasionally, *e.g.* in film 99, there was a large, more or less confused mass of protoplasm and chromatin, which in some cases could be seen to consist of more than one parasite. Bacillary forms were common, as were thicker forms intermediate between the bacillary and ring-shaped types. These various types occasionally occurred in one film.

“ But apparently not one of these infected cattle was in any way ill, though one of them (No. 110) also showed trypanosomes.”

Theileria parva?—Amongst the herd of cattle supplied by Messrs. Miller Bros., Ltd., there were found two animals showing only babesiae, and 15 others which suffered from both babesiasis and trypanosomiasis.

Bass culture of Theileria No. 1.—Bass cultures were made from one of the animals in the usual way, the incubation temperature being 40° C. The parasite, following Castellani and Chalmers (*Manual of Tropical Medicine*, 1913, p. 368), was *Theileria* (cytoplasm easily visible, division in fours, nucleus without dimorphism, bacillary forms present).

Cow No. 17, which was the animal from which the blood was taken for cultivation, showed a somewhat scanty infection with *Theileria*. Most of the forms of the parasite were minute and rounded, only a few bacillary forms being seen. No trypanosome were found. After five hours' incubation there were seen in addition to bacillary, rounded, pear-shaped and vibrio-shaped forms, a number of rounded bodies which contained four chromatin masses, arranged for the most part in the form of a cross, thus $\cdot\cdot\cdot$, but in a few instances arranged thus $\cdot\cdot\cdot$, whilst other parasites contained only two chromatin masses. At 10 hours the forms dividing into four were more numerous, and the other forms had grown more rounded. It was also observed that the bacillar forms were thicker and more like a cocco-bacillus. At 13 hours the four chromatin dots had separated and there was evidence of separate cytoplasm around each mass of chromatin. At 20 hours, whilst there were still a few of the parasites which showed the early stage of the division of chromatin, in most cases the bodies were widely separated, and many erythrocytes were seen to contain four, six or eight minute *Theileria*, whilst other red cells had evidently become freshly infected with single or multiple young spores. At 23 hours the smears showed mostly larger spherical and bacillary forms, and few bodies in a state of division. At 28 hours again there was a much larger proportion of dividing forms. At 32 hours the chromatin masses in the dividing forms were beginning to separate. At 38 hours most of the forms were separate and non-dividing, sometimes three and sometimes four babesiae being present in one cell, but for the most part only one or two in each infected corpuscle. At 44 hours large pear-shaped and spherical forms were most numerous. At 50 hours there were again a few dividing forms, and a number of the single forms were swollen and apparently degenerated. At 61 hours freshly dividing forms were still present, but for the most part the parasites were large, with a single nucleus pear-shaped and spherical forms predominating, with only a few bacillary forms.

Bass cultures of Theileria No. 2.—The same procedure was repeated with blood from the same cow, on the day following the first experiment. After 2 hours' incubation, spherical and bacillary form of the parasite predominated, and the *Theileriae* were mostly single in the host cell. At 4 hours the appearances were the same as before, but a few dividing forms had appeared. A few trypanosomes were also observed for the first time, and erythrophagocytosis had taken place to a slight extent. At 6 hours, many dividing forms were observable, most of them with four chromatin divisions. At 8 hours the red blood corpuscles showed a large infection with small spores, dividing forms were few, large spheres and bacillary forms being still numerous. There was mostly one or at most two parasites in each infected cell. At 14 hours the great majority of the red cells were infected, some containing large single forms in addition to dividing forms. All stages of the parasite were seen, rings, pears, spheres, bacillary and cocco-bacillary forms. At 16 hours the individuals resulting from the dividing forms were mostly separate, and each with its cytoplasm distinct. At 18 hours there was again a large number of forms in the early stages of division. At 20 hours these dividing forms had completed the process, many red cells showing a fresh infection with young parasites. At 31 hours there were as a rule

two or three parasites in each infected cell, and most of the forms were large, bacillary and pear-shaped being the commonest. At 40 hours single forms of medium size predominated. At 44 hours the individual parasites were larger, and there were a few new division forms. Some swollen and degenerating parasites were noted. At 48 hours there was again a fair number of fresh corpuscles newly infected, but degenerative signs were more marked. At 61 hours a large proportion of the parasites was degenerated.

The cultivation of the parasite enabled its nature to be established with more certainty than could have been done by examination of smears from the peripheral blood.

Schizogony took place several times during the first 48 hours; thereafter degenerative changes set in.

It would appear that the fine bacillary or vibrio-shaped forms grew into the more swollen cocco-bacillary parasites which did not show any division of the chromatin. Presumably these were the gametocytes. Attempts to transmit the infection to guinea-pigs by intraperitoneal and subcutaneous inoculation failed.

Water analysis.—With the exception of one complete chemical analysis and one analysis for the presence of lead, all the samples were submitted to bacteriological examination only. It will suffice to tabulate the results in the order in which they were obtained during the year.

Well, Native Prison, Kano	...	...	...	<i>B. coli</i> in	1 c.c.
Well, Ogoja	...	...	...	<i>B. coli</i> in	1 c.c.
Well I., Port Harcourt	...	...	...	No <i>B. coli</i> in	10 c.c.
Well II., Port Harcourt	...	...	...	<i>B. coli</i> in	1 c.c.
Well III., Port Harcourt	...	...	...	<i>B. coli</i> in	1 c.c.
Well IV., Port Harcourt	...	...	...	<i>B. coli</i> in	1 c.c.
Well, Police Barracks, Lagos	...	...	...	<i>B. coli</i> in	0.1 c.c.
Water Supply, Calabar	...	...	...	<i>B. coli</i> in	0.5 c.c.
Water Tap, Native Hospital, Calabar	...	...	...	<i>B. coli</i> in	1 c.c.
Soda Water Factory, Ebute-Metta	...	...	No	<i>B. coli</i> in	50 c.c.
Soda Water Factory, Lagos	...	...	...	<i>B. coli</i> in	1 c.c.
Soda Water Factory, Lagos	...	...	No	<i>B. coli</i> in	1 c.c.
Soda Water Factory, Lagos	...	...	No	<i>B. coli</i> in	1 c.c.
Well, Ebute-Metta	...	...	No	<i>B. coli</i> in	1 c.c.
Water Supply, Native Hospital, Calabar	...	No	<i>B. coli</i> in	1 c.c.	
Water Supply, Native Hospital, Calabar	...		<i>B. coli</i> in	1 c.c.	

Bacillus isolated from water.—Dr. H. Andrew Foy sent an agar slope and a Conradi Drigalski plate of a culture of a bacillus isolated from well water at Kano. The bacillus was a motile rod-shaped organism with rounded ends. There was only one flagellum—terminal. It was gram-negative. Indol was formed in peptone water, in small amount, after a few days. Acid but no curdling was produced in litmus milk, raffinose, maltose, mannite, galactos, salicin, arabinose; saccharose and dulcitol were unaltered, but acid, and no gas, was produced in glucose and levulose. Agglutinating sera were obtained from guinea-pigs inoculated with killed cultures of *B. typhosus*, *paratyphosus A* and *B*, and this bacillus in question. The agglutination reactions were:—

	<i>B. Typh.</i>	<i>Para. A.</i>	<i>Para. B.</i>	<i>Foy's B.</i>
Typhoid serum	...	+	—	—
Paratyph. A serum	...	—	+	—
Paratyph. B serum	...	—	—	+
Foy's bacillus serum	...	+	—	—

As the bacillus therefore did not conform to the tests for any of the well-known organisms its identity has remained undetermined.

Organisms isolated from urine, fæces and well water.—Dr. Foy also sent a series of cultures of various organisms for confirmation or identification, which he had isolated either from patients suffering from diarrhoea at Kano, or from well water in the town. These bacilli included *B. typhosus* from urine, *B. paratyphosus* A. from fæces and from well water, *B. coli* from well water, *B. pyocyaneus* from fæces and from well water, and *B. cloacæ* from fæces and from well-water.

Entomology: mosquitoes from Lagos.—Dr. Dalziel sent regular collections of mosquitoes obtained from Lagos and its neighbourhood. During April, about 50 specimens were received. These were *Anopheles costalis*, *Culex consimilis*, *C. invidiosus*, *C. duttoni*, *C. univittatus*, *C. guiarti*, *Ochlerotatus nigricephalus*, all obtained in officials' bungalows, and *Stegomyia fasciata*, *Culex decens*, *Ochlerotatus caliginosus*, *O. domesticus* and *O. ochraceus* bred out from larvæ got in crab-holes.

During May, 56 specimens were identified. *O. irritans* and *O. nigricephalus* obtained at the Health Office, *Culiciomyia nebulosa* (bred from a pot of native medicine) and *Uranotænia annulata*, and *Culex thalassius* bred from larvæ in crab-holes.

In June, 188 mosquitoes were examined. They included *Culex thalassius* (crab-holes), *C. salisburyensis*, *C. insignis* (crab-holes), *C. invidiosus*, *C. tigripes*, *C. duttoni* and *C. consimilis*, *Ochlerotatus irritans*, *O. nigricephalus*, *O. punctothoracis* (these last three from larvæ in crab-holes), *O. cummingsi*, *Tæniorhynchus metallicus*, *T. aurites*, *Culiciomyia nebulosa*, *Uranotænia annulata*, *Anopheles umbrosus*, *Mansonioides africanus* and *Banksinella punctocostalis*.

During July, 152 mosquitoes were identified. *Culex quasigelidus*, *C. tigripes*, *C. thalassius*, *C. insignis*, *C. decens*, *C. fatigans*, *C. rima* (the last five from crab-holes), *Anopheles mauritanus*, *A. umbrosus*, *A. costalis*, *Ochlerotatus argenteopunctata*, *O. nigricephalus*, *O. punctothoracis*, *Uranotænia bilineata* var. *fraseri*, *U. annulata*, *Mansonioides africanus*, *M. uniformis*, *Tæniorhynchus annettii*, *Stegomyia luteocephala*, *S. fasciata*, and *Culiciomyia nebulosa*.

In September, *C. decens*, *C. quasigelidus*, *C. invidiosus*, *C. rima*, *Ochlerotatus irritans*, *O. nigricephalus*, *Uranotænia balfouri*, *U. bilineata* var. *fraseri*, *Anopheles umbrosus*, *Stegomyia fasciata* and *Culiciomyia nebulosa* were identified. During October there were obtained *Culex decens*, *C. tigripes*, *Stegomyia luteocephala*, *Ochlerotatus irritans*, *O. nigricephalus*, *Hodgesia sanguinis*, *Uranotænia bilineata* var. *fraseri* and *Culiciomyia nebulosa*.

Mosquito larvæ from Lagos.—Dr. Dalziel also sent up samples of larvæ found by the Sanitary Inspectors during their rounds. A table is appended giving details. It will be seen that the larvæ of ten species were obtained. These were, in their order of frequency, *Stegomyia fasciata*, *Culiciomyia nebulosa*, *Anopheles costalis*, *Ochlerotatus irritans*, *Culex decens*, *C. tigripes*, *C. duttoni*, *C. insignis* and *C. grahami*.

The larvæ of two known insect-carriers of disease (*Stegomyia fasciata*, yellow fever; *Anopheles costalis*, malaria) were very common. *Cyclops* (carriers of guinea-worm) were also found. The *stegomyia* larvæ, when they were found with other species, were most commonly associated with *Culiciomyia nebulosa*, and in order of frequency with Psychodids, *Anopheles costalis* (in wells) and *Ochlerotatus irritans* (in crab-holes). The *stegomyia* larvæ were found in agbo-pots, barrels, basins, buckets, holes in banana trees, canoes, crab-holes, catchpits, cocoa-nut shells, drums, drains, gutters, jugs, pools, pots, swamps, tanks, tins and wells.

Glossinæ from Lagos.—Dr. Best sent two specimens of *Glossina palpalis* caught in his bungalow in Lagos, and several were caught at the Institute.

Fleas from Lagos.—Dr. Dalziel sent fleas at intervals, from rats caught in Lagos. All the insects were *Xenopsylla cheopis*.

Flies from Opobo.—Dr. Macfarlane, Dr. Ellis and Capt. Walker, D.S.O., sent numerous collections. They included *Tabanus secedens*, *T. obscurehirtus*, *Chrysops longicornis*, Chironomids, *Eristalis*, Dolichopodids Empipids, *Glossina caliginea*, *G. palpalis*, *Anopheles costalis*, *Culex decens*, *C. grahami*, *C. rima*, *C. fatigans*, *C. invidiosus*, *Culiciomyia nebulosa*, *Stegomyia africana* and *Stegomyia fasciata*.

Flies from Forcados.—*Culex fatigans*, *C. decens*, *C. invidiosus* and *Anopheles costalis* were received from Forcados.

Flies from Calabar.—*Glossina palpalis*, *Tabanus socialis*, *T. besti* and *Culex alborvirgatus* were forwarded from Calabar.

Flies, etc., from various places.—Larvæ and adults of *Stegomyia fasciata* and *Culiciomyia nebulosa* were obtained from Warri, and larvæ of *Stegomyia fasciata* and *S. sugens* were sent from Lokoja. *Hippocentrum versicolor* was obtained from Obudu. *Mansonioides* received from Onitsha. Dipterous larvæ were found in the stomach of a horse at Yaba.

Dr. J. E. L. Johnston made a large collection of blood-sucking insects from the neighbourhood of Kaduna.

The mosquitoes taken at Kaduna Bridge were *Culex fatigans*, *C. annulioris*, *C. duttoni*, *Anopheles costalis* and *Culiciomyia nebulosa*. Those found at Ubassa were *Culex tigripes*, *C. duttoni*, *Stegomyia africana*, *Culiciomyia nebulosa* and *Ochlerotatus cumminsi*.

At Buga, *Culex duttoni*, *C. decens*, *Culiciomyia nebulosa*, *Stegomyia fasciata*, *S. sugens*, and *Ochlerotatus cumminsi* were obtained. *Stegomyia fasciata*, *S. simpsoni*, *Mansonioides uniformis*, *Ochlerotatus cumminsi* and *Culiciomyia nebulosa* were taken at Kadamaa.

Three species were caught at Afaka, *Stegomyia simpsoni*, *S. africana* and *Culiciomyia nebulosa*, and three also at Doka, *Anopheles costalis*, *Culex duttoni* and *C. tigripes*.

Culiciomyia nebulosa, *Culex duttoni*, *Anopheles costalis* and *Stegomyia fasciata* were obtained at Riga Chikun.

Stegomyia sugens and *Culex fatigans* were found at Kakuri, *Mansonioides uniformes* at Kumin Kaduna, and *Culiciomyia nebulosa* at Benawa and Kadi.

Ticks from Kaduna, etc.—*Amblyomma variegatum*, *Hyalomma ægypticum*, *Boophilus annulatus*, and *Hæmaphysalis leachi* were taken at Doka.

Hyalomma ægypticum, and *Amblyomma variegatum* were found at Togachi.

At Kaduna Bridge, *Boophilus annulatus* was obtained.

Hæmaphysalis leachi, *Boophilus annulatus* and *Amblyomma variegatum* were taken at Kadi.

Amblyomma variegatum and *Boophilus annulatus* were found at Riga Chikun and Edemawara.

Tabanids from Kaduna, etc.—*Hæmatopota pertinens*, *H. lacesens*, *H. Sp. nov.* and *Tabanus albipalpus* were take at Kaduna River.

Hæmatopota pertinens, *H. gracilis*, *H. (Sp. near tenuicrus)* and *Tabanus fasciatus* were obtained at Bugai.

Hæmatopota vittata and *Tabanus billingtoni* were got at Afaka.

Hæmatopota gracilis, *H. puniens*, *Tabanus secedens* and *T. socialis* were caught at Doka.

Hæmatopota Sp. nov., similar to that caught at Kaduna River, and *Tabanus tæniola* were found at Kadi.

A large number of non-blood-sucking flies was also collected, including Tipulids, Drosophilids, Anthomyids, Syrphids, Dolichopodids and Tachinids.

Ticks from Aro and Ibadan.—The Ticks received from these places were all identified as *Hæmaphysalis leachi*.

Mrs. Summers-Connal is responsible for most of the identifications of flies. Mr. Neave, at the British Museum, named the *Hæmatopotas*.

Helminthological.—Filariasis and ankylostomiasis have already been noted.

Worms obtained from cats, dogs, sheep, goat, cattle, monkeys and other animals have been collected, but the identifications are not yet complete. *Fasciola angusta* and an Anoplocephaline have been found in sheep.

Amphistomes and a Moniezia have been obtained from the ox.

Æsophagostomum, *Trichostrongylus*, an Anoplocephaline and *Uncinaria cernua* have been collected from the goat. *Stephanurus dentatus* and *Æsophagostomum dentatum* have been got from the pig. *Dipylidium caninum*, *Ankylostomum caninum* and *Uncinaria stenocephala* have been found in the dog.

Dipylidium caninum has also been obtained in the cat.

Heterakis vesicularis has been found in the chicken.

Museum specimens.—The following specimens, amongst others, have been received :—

Stomach showing punched out gastric ulcer. Large sarcomatous kidney.

Enlarged and markedly nodulated liver. Great intestine, showing chronic dysentery. Two medium sized gall-stones.

Stomach and contents, yellow fever.

Spleen showing old infarct.

Twelve leeches.

Spleen with numerous plaques on surface.

Ruptured aneurism.

Pyonephrosis.

Intussusception (female, adult).

Tænia saginata.

A Crayfish (from Mr. Davidson, Forcados).

Mud and Corals from sea-bottom (Mr. Cadman).

Donors of material.—The following were good enough to send material to the Institute :—Mr. Boyle, C.M.G., Dr. T. B. Adam, Mr. R. C. Andrew, Dr. Ashton, Dr. Bailey, Dr. Bate, Dr. Beale-Browne, Mr. G. Bell, Dr. Best, Dr. Booth, Dr. Braithwaite, Dr. Breeks, Dr. Brierley, Mr. Cadman, Dr. Chartres, Dr. Chichester, Dr. W. S. Clark, Dr. Cobb, Dr. Cole, Dr. Craig, Dr. Currie, Dr. Dalziel, Mr. Davidson, Dr. Digby, Dr. Ellis, Dr. Ferguson, Dr. Foy, Dr. J. C. Franklin, Dr. E. M. Franklin, Dr. Gallagher, Dr. Garstin, Mrs. Garvey, Dr. Gibson, Dr. Glover, Dr. Graham, Dr. Grant, Dr. G. M.

Gray, Dr. C. G. Grey, Dr. Gordon-Hall, Dr. Hamilton, Dr. Hannington, Major Heard, Mr. Hellard, Dr. Hungerford, Dr. Johnson, Dr. Kauntze, Dr. Laurie, Mr. Lenke, Dr. Leonard, Dr. Macfarlane, Dr. Maclaine, Dr. Mackinnon, Dr. Macpherson, Dr. Manning, Dr. Jackson Moore, Dr. Neale, Dr. Nolan, Dr. North, Mr. Nugent, Dr. O'Dea, Dr. Parkinson, Dr. Peacock, Dr. Pickels, Dr. Pirie, Dr. Pollard, Dr. Porteous, Dr. Quirk, Dr. Ross, Dr. Sapara, Dr. E. L. Sieger, Dr. J. S. Smith, Mr. Buchanan Smith, Dr. Smythe, Dr. Snell, Dr. Stewart, Dr. Suffern, Dr. Swann, Dr. Taylor, Dr. J. W. Thomson, Dr. Tipper, Capt. Walker, D.S.O., Mr. Willans, Dr. A. H. Wilson, the Medical Officer, Kaduna, and the Dispenser, Ondo.

Places from which material was sent.—Material was sent from Abakaliki, Abeokuta, Abo, Afikpo, Ameke, Aro, Badagry, Baro, Benin City, Brass, Calabar, Ebute-Metta, Eket, Forcados, Ibadan, Ikot-Ekpene, Itori, Itu, Kaduna, Kakuri, Kano, Lagos, Nassarawa, Obudu, Ogoja, Okwoga, Ondo, Onitsha, Opobo, Owerri, Owowo, Port Harcourt, Sekondi, Siluko, Warri, Wasimi, Zungeru.

The Staff.—Dr. Connal was on duty until 28th October, when he proceeded on leave. Dr. Coghill returned to duty on 12th October after having served under the Yellow Fever Commission for one year on the Gold Coast. Dr. Seidelin completed his investigations at Yaba on 5th February. Dr. Scott Macfie proceeded home on leave on 16th March, and thereafter took up the duties of Pathologist at Accra. Dr. J. E. L. Johnston worked as Local Investigator under the Yellow Fever Commission from March till October. Sergt. Phipps went on leave on 9th June, and was relieved by Sergt. Pollitt, who arrived on 28th May. Dr. Macpherson, Dr. Paterson and Dr. Mackey, whilst they were in charge of the neighbouring Asylum, were attached to the Institute and did valuable work. Dr. Paterson helped with the yellow fever investigation, the search for trypanosomes in films from pig's blood and in entomology.

Mr. S. A. Cardoso succeeded Mr. Austin as Clerk at the Institute. Mr. Rostico was on duty throughout the year as Laboratory Assistant. The labourers' Staff changed frequently, in personnel but not in numbers.

New Buildings.—A small entomological laboratory and half of a stable were erected during the year.

Acknowledgments.—Thanks are rendered to all those already named on pages 139 and 140, who sent material. Advice and assistance is also gratefully acknowledged to Col. Alcock, Dr. Newham, Dr. Leiper and Dr. J. G. Thomson at the School of Tropical Medicine, London; to Dr. Wenyon, Wellcome Research Bureau, London; and to Mr. Marshall, Mr. Neave and Mr. Edwards at the British Museum.

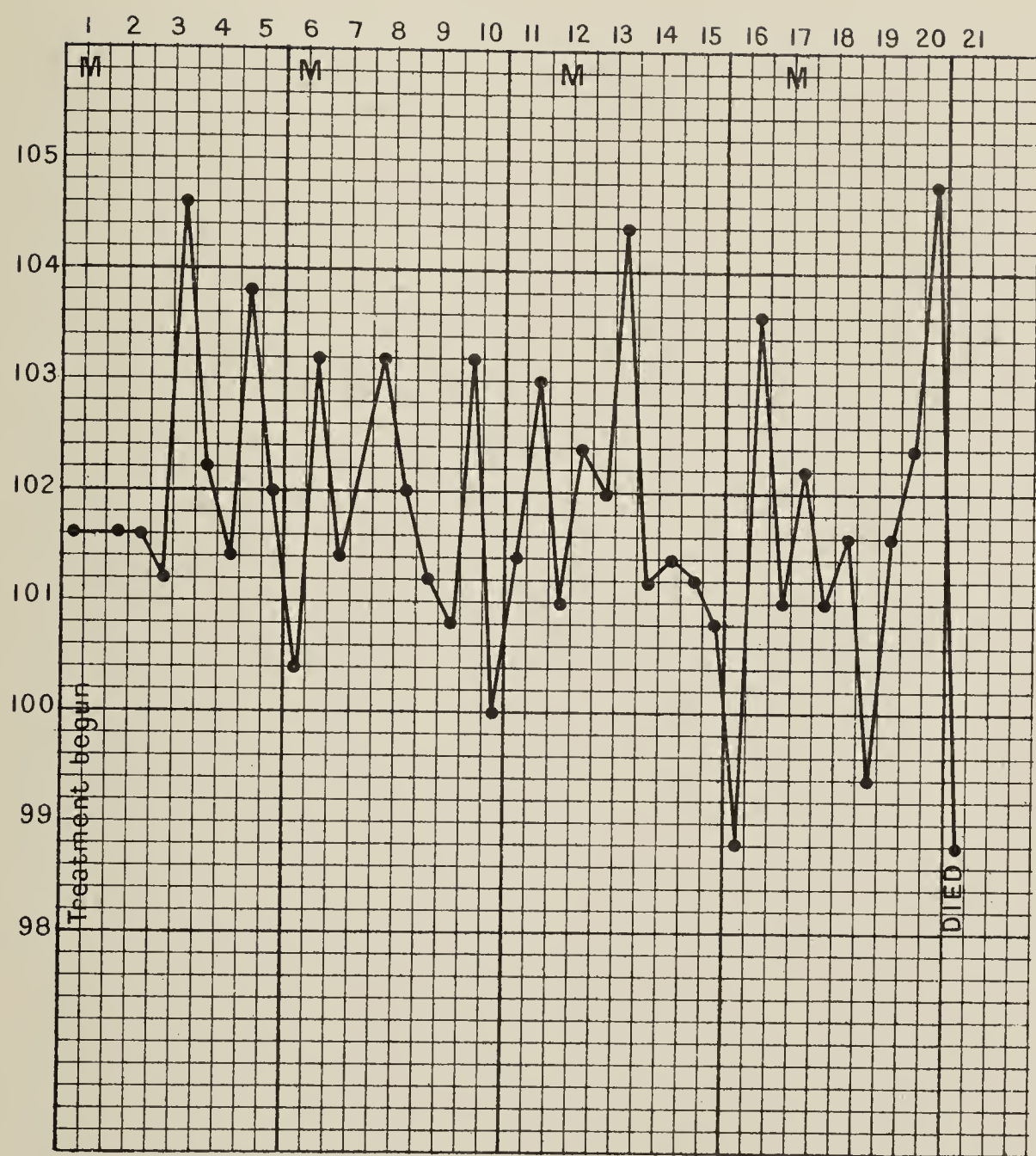
Meteorological records were kept daily, and forwarded monthly to the Surveyor-General.

An Index and a Table (mosquito-larvæ in Lagos) and three Charts (the temperature of three cattle undergoing treatment for Trypanosomiasis) complete this Report.

A. CONNAL.

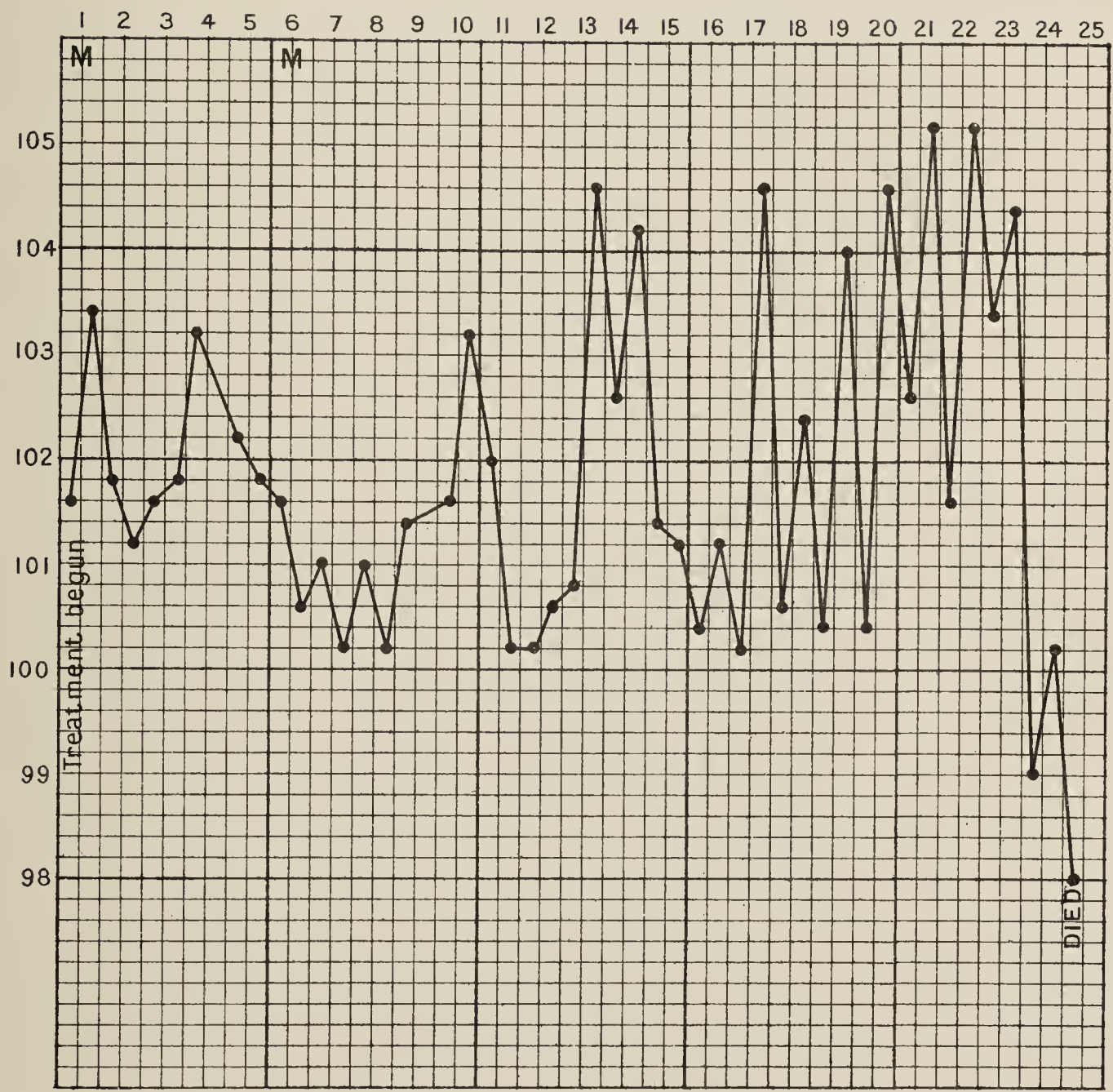
H. SINCLAIR COGHILL.

MEDICAL RESEARCH INSTITUTE,
YABA, NEAR LAGOS,
NIGERIA.



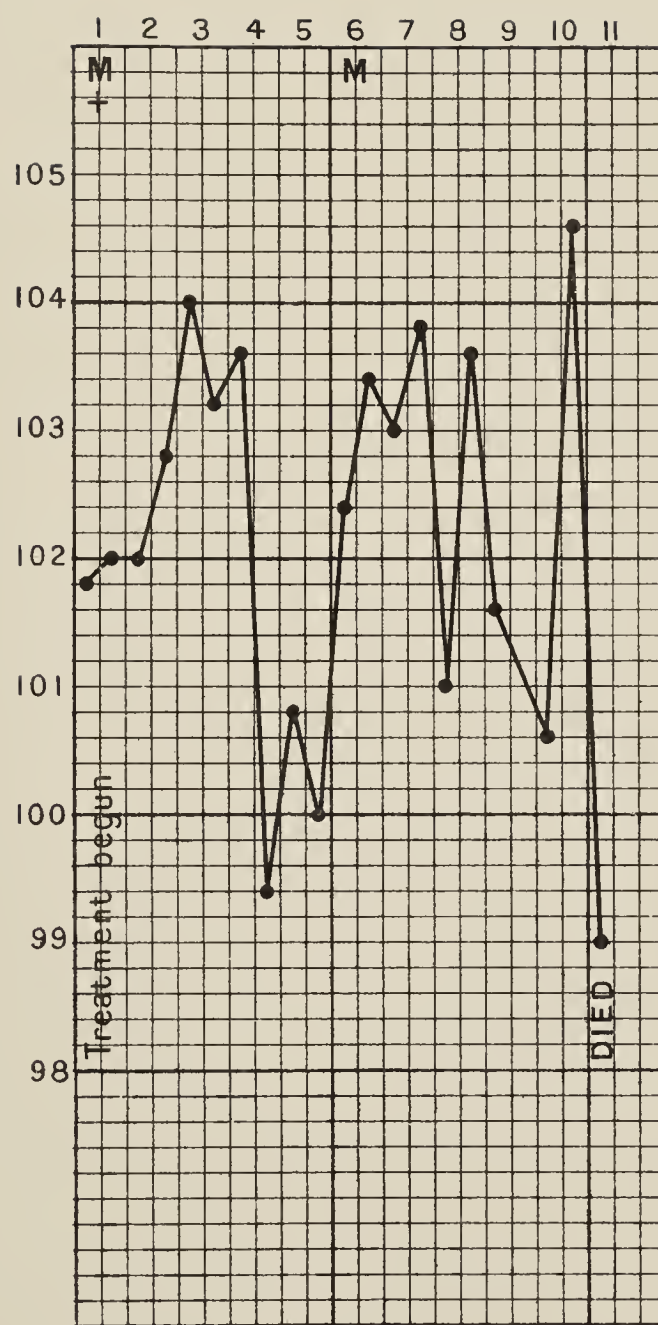
COW N° 41A (Trypanosomes)

M = Atoxyl 9 grains



COW N° 42 A (Trypanosomes & Babesiae)

M="606" grms. VI



COW N° 43 A (Trypanosomes)

M = Atoxyl 8 grams
+ = Serum 20 cc.

M = Atoxyl 8 grams

MOSQUITO-LARVÆ IN LAGOS.

Month.	Bottles of Larvæ.	<i>S. fasciata.</i>	<i>S. fasc. Culic. neb.</i>	<i>S. fasc. Psychodids.</i>	<i>S. fasc. Anoph. cost.</i>	<i>S. fasc. Ochl. irrit.</i>	<i>S. fasc. Chironomids.</i>	<i>S. fasc. Cul. neb. Psych.</i>	<i>S. fasc. Ochl. irr.</i>	<i>S. fasc. Culic. neb.</i>	<i>S. fasc. C. decens. A. cost. Psychod.</i>	<i>S. fasc. Culic. neb. C. tigris.</i>	<i>S. fasc. C. tigris.</i>	<i>S. fasc. C. decens.</i>	<i>S. fasc. C. tigris.</i>	<i>S. fasc. Culic. neb. C. tigris.</i>	<i>S. fasc. Culic. neb.</i>	<i>Culicomyia nebulosa.</i>	<i>Anopheles costalis.</i>	<i>Ochlerotatus irrit.</i>	<i>Culex decens.</i>	<i>Culex tigris.</i>	<i>Culex duttoni.</i>	<i>Culex insignis.</i>	<i>Culex grahami.</i>	<i>Ochlerotatus nigric.</i>	Psychodidae.	Chironomidae.	<i>Cyclops.</i>
January ...	66	59	—	3	1	—	2	—	—	—	—	—	—	—	1	—	—	5	2	—	—	—	—	—	—	—	6	2	—
February ...	57	40	2	2	—	—	—	—	—	—	1	—	—	5	1	—	—	14	3	—	—	—	—	—	—	—	6	1	—
March ...	78	61	1	1	1	—	—	—	—	—	—	—	—	2	—	—	—	16	2	—	2	—	—	—	—	—	4	—	—
April ...	106	85	4	1	—	—	—	1	—	—	—	—	—	2	—	—	—	24	1	—	2	—	—	—	—	—	3	—	—
May ...	127	106	2	4	1	—	—	—	—	1	—	—	—	3	1	6	—	13	3	—	3	—	—	—	—	—	7	—	—
June ...	179	138	6	1	5	—	—	1	—	—	—	—	1	2	1	—	—	34	15	7	2	1	—	—	—	—	3	—	—
July ...	176	130	1	—	3	3	—	—	1	—	—	1	—	1	—	—	—	38	13	5	1	—	—	—	—	—	1	—	—
August ...	144	101	3	—	—	—	—	—	—	—	—	—	—	—	1	—	—	34	8	2	—	1	—	—	1	—	—	—	—
September ...	155	107	1	1	—	—	—	1	—	—	—	—	—	—	2	—	—	39	9	5	—	2	—	—	—	—	3	—	1
October ...	153	92	2	—	—	—	—	—	1	—	—	—	—	—	2	—	—	49	13	6	—	2	—	—	1	—	2	—	—
November ...	149	110	2	4	3	2	2	—	—	—	—	1	—	1	2	2	—	27	9	8	1	2	2	—	—	—	10	2	—
December ...	132	106	6	1	3	2	—	—	—	—	—	—	—	1	4	4	—	20	8	4	1	4	4	—	—	—	5	—	—
	1,522	1,135	30	18	17	7	4	3	2	2	1	1	1	1	15	12	1	313	86	37	17	15	12	1	1	1	50	5	1

INDEX.

	PAGE
Acknowledgments	140
Ankylostomiasis	132
Arteriosclerosis	134
Babesiasis	134
Bass cultures, in	135
Bass cultures	125
<i>Plasmodium fulciparum</i>	126
<i>Plasmodium</i> Sp ? (from Monkey)	128
<i>Theileria parva</i>	135
Yellow fever, in	122
Blackwater fever	129
Cattle	130
Trypanosomiasis in	130
Babesiasis in	134
Treatment of	135
Cats, Dysentery in	130
Chrysops	137
Dogs, Trypanosomiasis in	130
Donors	139
Dysentery	129
Human	129
in cats	130
in goats	130
Filariasis	132
Glossina	137
Goats, Dysentery in	130
Gonorrhœa	133
Guinea-pigs	122
Normal	122
Yellow fever in	122
Hæmatopota	138
Helminths...	139
Hippocentrum	138
Malaria	124
Bass cultures in	125
Europeans and natives, in	124
Monkeys, in	128
Measles	134
Meteorological records	140
Monkeys, Malaria in	128
Yellow fever in	123
Mosquitoes	137
Larvæ	141
Experiments with, yellow fever	123
monkey malaria	128
Museum specimens	139
New buildings	140

INDEX—*continued*.

	PAGE									
Pigs, Trypanosomiasis in	130
Pneumonia	134
Poisonings...	134
Porocephaliasis	134
Pyæmia	134
Quinine, in monkey malaria	129
Skin diseases	133
Staff	140
Stools, examination of	137
Sunstroke	134
Syphilis	133
Tabanus	138
Throat diseases	133
Ticks	139
Trypanosomiasis	130
Human...	130
in cattle	130
in dogs...	130
in pigs...	130
treatment of, in cattle	131
Tuberculosis	133
Tumours	134
Typhoid fever	132
Urine analysis	134
Wassermann reaction	133
Water analysis	136
Widal reaction	132
Xenopsylla	138
Yellow fever	122
in Nigeria...	123
possible, in native children	123
possible carriers of	124
experimental, in guinea-pigs	122
in monkeys	123
mosquito experiments in	123
Bass and Ziemann cultures in	122
Ziemann's cultures	122

II.—THE TRANSMISSION OF TRYPANOSOMÆ BRUCEI OF NIGERIA BY *GLOSSINA TACHINOIDES*, WITH SOME NOTES ON *TRYPANOSOMA NIGERIENSE*.

BY G. H. GALLAGHER, L.R.C.P. and S. (Ireland),

Medical Officer, West African Medical Staff.

During my last tour in Nigeria I was placed in charge of the Sleeping Sickness Camp at Eket. This district lies in the eastern division of the southern provinces of that colony. The southern border of the district abuts on the sea, which inundates some considerable portion of that section of it. No part of the district is much above the sea level, and a profuse network of streams intersect the centre of it. As a result of this and the not inconsiderable rainfall, vegetation is marked, especially the palm tree and the short, thick scrub which grows so readily during the years the land lies untilled. Here, as may be conjectured, is the ideal haunt of the tsetse, and in former days when game must have been more plentiful than now the country must have been a veritable Eden for them. As a matter of fact, *Glossina* are not very plentiful—at any rate in comparison to the well-known fly-belts of the Congo and East Africa—and rarely is one annoyed by these pests along the Government road which passes east and west through the middle of the district.

A few words as regards the distribution of the tsetse fly may be of some interest. I have failed to find any mention in any of the literature on the subject of the existence of *G. tachinoides* or other tsetse in the Eket district, though my predecessor, the late Dr. Foran, in his various reports while he was in medical charge of the Sleeping Sickness Camp, repeatedly pointed out that this fly was very prevalent in the district. Later, Dr. Macfie, I believe, sent home specimens of the fly which have been verified. Next in order of numbers come *G. palpalis* and *G. caligenea*, though these are more plentiful nearer the two larger streams to the east and west of the district.

It was from such ideal surroundings that I obtained two strains of trypanosomes (a third strain, probably *T. nanum*, obtained by feeding *G. palpalis* on a clean guinea-pig, was lost owing to failure in sub-inoculating) which were brought home for further identification and study.

STRAIN I.—*T. BRUCEI*.

It may be well to state here that what I take to be *T. brucei* is a polymorphic trypanosome of the type consistently figured and described under that name by Sir David Bruce in his various reports.

The existence of such a trypanosome, showing posterior nuclear forms, was first mentioned by Scott Macfie from Northern Nigeria in 1912. Their diagnosis of the parasite was based apparently on its morphological character, and a certain number of inoculations of it into guinea-pigs and rats.

The strain of *T. brucei* which this paper refers to was obtained by feeding a hundred and twenty-eight *G. tachinoides* on a clean guinea-pig. This animal was first found infected on May 2nd this year, and died on

my voyage home on the 25th July. Another guinea-pig was the next day inoculated from it, and when first examined on the 2nd of September was found to be infected. Since that date it has been maintained in white rats.

Description of the parasite.—The living trypanosomes, though freely mobile, show little translatory power, and the shape and size of the body, presence of the nuclear and the long, free flagellum (when present) can easily be made out, the undulating membrane being thrown out in sweeping waves.

In stained preparations the parasite appears to be of the classic polymorphic type showing the three characteristic variations in shape and length, namely, (1) long and slender, with long, free flagellum, (2) short and stumpy, with little or no free flagellum, including the posterior nuclear variety, and (3) the intermediate forms.

These three forms were always present at some time in the life of an inoculated animal though in varying proportions. Speaking generally, it was found that the first few days of infection showed a preponderance of the long, slender type, and that as the infection grew the numbers of the short, stumpy and of the intermediate forms increased, so that in some cases, where the infection became relatively chronic (as in Rat IV.), these forms seem to become the dominant type. With regard to the posterior nuclear forms there is even a greater want of correlation here. One animal may show this type quite early in the disease, in another their appearance may be delayed. Again, as pointed out by Wenyon and Hänschell (2) to be the case with *T. rhodesiense*, the relative proportions of posterior nuclears to the other types shows marked variations. For instance, counting a thousand trypanosomes on approximately the same day and intensity of infection from Rats IV. and V. gave the following relative percentages:—

Rat IV.	...	...	...	0	per cent.
Rat V.	...	...	...	36·5	per cent.

Further prolonged search in the case of Rat. IV. revealed only one posterior nuclear form, though there were approximately two hundred parasites in one field of the microscope. Coincidentally it may be stated, for the support of those who look on these forms as an index of virulence, that Rat V. lived 36 days, whereas Rat IV. lasted for 59 days, though it would be only fair to point out that Rat IV. was inoculated from Rat III. when only one trypanosome was found by coverslip examination, whereas Rat V. was inoculated from Rat III. after the death of the latter.

Curves showing the percentages in length of this trypanosome show that the parasite varies in length from 12 μ to 32 μ , while the greater number measure 20—21 μ .

Comparison shows these curves to be very similar, if not identical, with those drawn by Sir David Bruce from his Zululand strain (3). This similarity in morphology of the trypanosomes and their respective curves is not disturbed by a glance at the animal reactions given below.

Animal Reactions.—These have been done only on a very limited scale. If one may be pardoned for generalising in the face of this, it may be said the parasite is very fatal to the ordinary laboratory animals. The ease and surety with which these are inoculated is striking and the multiplication of the parasite is rapidly developed. The average length of the life of six rats is 35 days, the longest living 59 days, while the shortest life covered 14 days.

The inoculation period varied from 6 to 13 days.

Animal.	Date and how inoculated.	Date when Trypanosomes first seen.	Date of death.	Days.
1. Guinea-pig II.	<i>G. tachinoides</i>	(?) May 2nd ...	July 25th ...	85
2. Guinea-pig IV.	G.P. II.—at death ...	(?) September 1st	November 11th	110
3. Rat I. ...	G.P. IV.—1st September ...	September 7th	September 14th	14
4. Rat. II. ...	Rat I.—10th September	September 16th	October 14th ...	35
5. Rat III. ...	Rat II.—16th September	September 21st	October 14th ...	29
6. Rat IV. ...	Rat III.—21st September	?	November 18th	60
7. Rat V. ...	Rat III.—14th October ...	October 27th...	November 19th	37

Discussion as to the identity of the Parasite.—In morphology and animal reactions this strain is so similar to that of Sir David Bruce's Zululand strain that I conclude without fear of criticism to label it undoubtedly *T. brucei*. I fear, however, in doing so I shall run contrary to those observers who claim that the real and original *brucei* was not a polymorphic one. I do not wish to enter into the field of contention, but having read his papers and being present at the discussion following Sir David Bruce's classification of the trypanosomes at the October meeting of the Society of Tropical Medicine and Hygiene, suffice it for me to say that I came away with the impression that the original of *T. brucei* was a polymorphic trypanosome. The curves from this Nigerian *brucei* differ somewhat from those given by Ogawa for *T. pecaudi*. Ogawa's figures accord the largest percentage of trypanosomes a length of 25 to 26 μ . Now, if reliance is to be placed in curves, this would lead to the deduction that *T. pecaudi* and *T. brucei* are essentially different. Even if curves and figures were binding, I fear it would be difficult for me to believe and reason that two polymorphic trypanosomes so identical in general morphological details and virulence to animals as *T. pecaudi* and *T. brucei*, one coming from French Dahomey and the other common in Nigeria, are not identical. Moreover, both the curves in this paper and that of Ogawa's differ when one compares the figures for the larger and smaller number. Ogawa's figures show a higher proportion of average sized trypanosomes by the 300 and 200 individual curves, whereas both the 250 and 500 individual curves in this paper show a smaller percentage for the average sized trypanosomes. Besides, Ogawa's paper refers to a strain of *T. pecaudi* of six years ago, and kept up in the Pasteur Institute during that time. May not the parasite have changed slightly its morphology? To revert to the identity of *T. brucei* (Nigeria) and *T. pecaudi* (Dahomey), it seems likely that these two trypanosomes, morphologically identical and capable of transmission by the same species of glossina, viz., *G. tachinoides* (Bouet and Roubaud have shown that *tachinoides* does transmit *T. pecaudi*), are one and the same. Moreover, it is not unreasonable to assume that the polymorphic trypanosome found well-nigh throughout Africa, certainly from that part mapped out by Senegal to the Soudan in the north and British East Africa to German South-west Africa in the south, are one and the same trypanosome. The confusion of the whole subject is regrettable, and it would be kind if the ruling minds would agree to make easy the path of the newcomer and beginner by avoiding unnecessary confusion and retaining for this polymorphic trypanosome, transmitted in some places by *G. morsitans*, in others by *G. tachinoides* or *G. conggepalpis* (6), which is capable of producing posterior nuclear forms, and which is so virulent to animals, the name *T. brucei*, and thus save him from the brain-racking medley of synonyms as *T. pecaudi* and *T. ugandae*.

I will conclude with a reference to the contested identity of *T. rhodiense* and *T. brucei*, and would suggest to the powers that be that in such a country as West Africa, where human trypanosomiasis is not uncommon, and where also *T. brucei* is to be found, that a sufficient number of laboratory animals be kept at each dispensary in the country to allow of every human case being

inoculated into these animals. As is well known, those who do not believe in the identity of these two parasites point out (and this must bear some considerable weight) that in West Africa, among other countries, the more virulent Rhodesian strain is absent. This inexpensive scheme may lead to a discovery that some of the more fatal cases of sleeping sickness which have up to this, for want of proof to the contrary, been put down to *T. gambiense* are really what is claimed to be *T. rhodesiense*.

STRAIN II.—*T. NIGERIENSE*. (SCOTT-MACFIE, 1913.)

This strain was brought home in two animals, viz., a guinea-pig and a monkey. It was obtained in the following manner. One of the sleeping sickness patients under treatment developed, on the evening of March 24th, convulsive seizures which ended fatally in spite of remedies. As a preliminary, eight drachms of cerebro-spinal fluid were withdrawn and collected in a measure glass with the idea of reducing tension. I cannot say this had any marked effect in relieving the convulsions and, as stated, the patient died next morning. The same night the upper four drachms of fluid was injected intraperitoneally into guinea-pig No. 1, and the remaining fluid was similarly injected next morning into a monkey. Both these animals had been under careful protection and inspection for over two months. Unfortunately, owing to a bout of illness, I was unable to examine these animals till the 3rd May, on which I found trypanosomes in both. Since that date the animals were examined every three days. Never at any time were parasites at all numerous, and at first it was not unusual for parasites to be absent on two such examining days, *i.e.*, for a period of a week. With this to explain my difficulties I must state that I have nothing new to record. As stated by Macfie, who first named the parasite, it is peculiarly a virulent. The human mortality is under 5 per cent., records of the sleeping sickness camp which, owing to the short time it has been actually in existence are probably not reliable for purposes of deduction, place it round about 3 per cent. It is moreover with great difficulty carried on in laboratory animals. Since being brought home three guinea-pigs were injected from the blood of the original guinea-pig. Blood examination at the time of inoculation showed parasites to be present in the latter. Parasites have not been found in the sub-inoculated animals up to date of writing. A mouse was injected with the cerebro-spinal fluid of the monkey. This also failed.

The parasite on its first appearance is similar to *T. gambiense*, *i.e.*, it has the same long, slender body and a long free flagellum. As stated above, parasites were never found to be numerous so that I can give no curve or other such data.

Since being brought home blood examination has revealed the remarkable, short, stumpy forms described by Macfie which led him to claim for the parasite a specific identity. I have placed these before competent observers who agree that they are relatively more abundant than in any strain of *T. gambiense* they have worked with. One, indeed, said, "were I asked if this were *T. gambiense*, I feel sure I would say, no."

As stated above, I fear I have recorded nothing here which has added to our knowledge of the parasites. Before closing, however, I would plead that the name *T. nigeriense* be allowed to stand till further investigation shows it to be identical with *T. gambiense*.

CONCLUSIONS.

I.—That a polymorphic trypanosome indistinguishable from the Zululand strain of *T. brucei* and very probably, if not actually, identical with it, occurs in the Eket district of Nigeria and is probably to be found in all that country in as likely situations.

II.—That this trypanosome is carried in the natural state by *Glossina tachinoides* as has been shown previously by Bouet and Roubaud (5) who regarded his trypanosome *T. pecaui*.

III.—That the polymorphic trypanosomes, *T. brucei* (*T. ugandae*) and *T. pecaui*, found in various parts of Africa, are identical, though not naturally always transmitted by the same species of *Glossina*.

IV.—That it is desirable that an attempt be made to demonstrate a posterior-nuclear producing trypanosome among the more fatal cases of human sleeping sickness by inoculating every human case into animals.

V.—There is ground for belief that *T. nigeriense* (Scott Macfie) is not identical with *T. gambiense*, and that further research on this parasite is indicated.

Finally, I should like to take this opportunity of expressing my indebtedness to Dr. Balfour, Director of the Wellcome Bureau of Scientific Research, for placing the laboratories of that Institution at my disposal, and also to Dr. C. M. Wenyon, also of the above institution, for his help and assistance.

REFERENCES.

1.—Annals of Tropical Medicine and Parasitology, Vol. VIII., No. 1. pp. 3–4.

2.—“Further note on *Trypanosoma rhodesiense* from three cases of Human Trypanosomiasis.”—The Journal of London School of Tropical Medicine. Vol. II. Part II.

3.—Proceedings of the Royal Society, Series B. Vol. 87.—No. B. 598.

4.—Annals of Pasteur Institute, t. XXVIII. Juillet. No. 7.

5. G. Bouet et E. Roubaud. Annals Pasteur Institute 1910, t. XXIV. pp. 664 and 667.

6.—G. Bouet et E. Roubaud. Soc. de Path. Exotique. 11 Octobre, 1911.

III.—REPORT OF AN INVESTIGATION INTO THE PREVALENCE OF TRYPANOSOMIASIS IN ITU AND IKOT-EKPENE.

BY W. S. CLARK, M.B., CH.B., D.P.H. (ABERDEEN), D.T.M. (LIVERPOOL),
Medical Officer, West African Medical Staff.

The investigation was begun about the middle of June, 1914, and extended, with intervals due to transport difficulties, until the end of July, 1914, when the work was interrupted by the outbreak of the war. The investigation therefore took place about the middle of the rainy season. The area travelled over comprised Itu district, part of Ikot-Ekpene district, and a small part of Uyo district.

Physical Features of the district. The country is mainly a plateau rising from low swampy ground at the Cross and Enyong Rivers to a height of from one to three hundred feet or more, the more hilly part being in the north-east of Ikot-Ekpene. There are numerous small streams in the hollows, swampy in the rainy season, as is also the strip along the Cross and Enyong Rivers.

The geological formation is mainly reddish sand, often of considerable depth, under that reddish clay and in places shale. Where the sand is of great depth the small streams have cut numerous great ravines with steep sides often fifty to a hundred feet deep.

The vegetation is oil-palm forest, farms, dense bush and small patches of larger forest, all the streams being lined by dense bush. A very large proportion of the area is covered by native farms growing cassava, Indian corn, yams, &c. Taking this part of the country as a whole it is densely populated and there is more or less of a land hunger.

The people are Ibibios and generally speaking of a low type of humanity ; their physique is poor, but they seem very prolific, judging by the large numbers of young children in their towns. Scattered along trade routes and especially along the Cross River are small more civilised communities of other tribes, mainly Efiks and Aros, with a few Housas, Yorubas, &c.

Away from these more civilized centres the Ibibios have no towns as we understand the term ; their dwellings are congregated to some extent, forming some sort of scattered village, but almost every house or compound is surrounded by bush, and one rarely sees more than three or four compounds together. Whichever way one walks in the bush one comes on these little hamlets every five, ten or fifteen minutes, rarely longer. As these often are parts of one town and the native roads intersect in all directions with little aggregations of huts along each, one can hardly tell when one is in a town indicated on a map. It is an easy matter to pass along these paths and miss the majority of these hamlets unless the eye catches sight of smoke or banana plantations, so closely are they surrounded by vegetation.

The villages are not as a rule situated close to streams, but generally distant three or four hundred yards or more. In a great many the majority of the inhabitants have a dirty and neglected and apathetic appearance.

Domestic Animals.--These are pigs, dogs, goats, ducks, sheep, cats and the small breed of Nigerian cattle and their numbers correspond to the order in which I have named them. Sheep are very few in number and I only saw cattle in two places and then a total of eight only.

Wild Animals.—Game is very scarce, the only animals I have seen are antelope, grass-cutter, a squirrel-like rodent, and monkeys, which latter are fairly numerous, especially in the dense bush along the streams. Bush-fowl are scattered everywhere, crows are numerous and the natives say that there are many crocodiles and a few hippopotami in the swampy parts, but I did not see any.

Glossina palpalis I found all over the district, not very numerous as a rule, but usually twos or threes here and there. *G. fusca* I found in one place, viz., between Ikpe Ikot Nkun and Ebam Ukot ; in this place *palpalis* swarmed, not less than about twenty attacking me at one time. Amongst these I saw three of the *fusca* group and succeeded in catching one. I was crossing a swampy place at the time and had removed some of my clothes and I noticed that whenever a fly alighted on exposed skin it proceeded to bite immediately, so that I was bitten several times in a few minutes. Nowhere else have I seen tsetse attack so fiercely and bite so quickly. Tabanidæ are fairly numerous, Chrysops notably so.

Investigation is very difficult until one gains the confidence of the natives, they are so suspicious, and it takes time and patience to do so. In several of the small villages visited I found only a few old people, all the others having disappeared into the bush. Very great assistance was given to me by the Missionaries in the district, of whom there were seven.

The plan was to examine by gland puncture as many individuals as possible, but owing to the fear of the natives of what was being done few examinations of gland juice could be made.

Sleeping sickness is well known all over the district and the chiefs and headmen could describe it quite well. They call it ODonIDAP—SLEEPING SICKNESS—the same name by which it is called in Eket district; none, however, would admit that there were any people sick with it in their towns at that time, although they said that two or three years or more ago many had had it and all were now dead. They say that it is an old sickness known in the time of their grandfathers. It appears that it is considered a disgraceful disease and is hidden if possible; it may be quite well known that certain persons have it, but none of the people care to take the responsibility of denouncing them as it were.

Enlarged cervical glands they call NSIPITON—nuts in the neck—but do not appear at all to connect it with sleeping sickness, nor do their native doctors practise gland excision, which is commonly done in some parts of Eket district as a curative measure for sleeping sickness. They do not connect it with the tsetse fly either. All are agreed that no case of sleeping sickness ever gets better, all die.

The first case of sleeping sickness (CASE I.) was found at Ibianang, on the Itu Ikot-Ekpene road, nine miles from Ikot-Ekpene; this was a man about 25 or 30 years of age, he was quite noticeably somnolent. I saw this man again about three weeks later and his condition was worse; he lay asleep in the blazing sun in the middle of the compound. (Details of the cases found are given at the end of this report.) Two fatal cases of sleeping sickness occurred in this compound and were reported by Dr. Gallagher, M.O., Ikot-Ekpene, at the end of 1912, both children about twelve and fourteen years of age. There was also a woman died of the same disease and she lived near the compound where the above two children died. In this compound three children with enlarged cervical glands were examined by gland puncture, but the result was negative. A few weeks later Miss Welsh, a missionary, told me that she had heard of two cases in the sleeping stage at a place called Mbiakpa, six miles along the same road and three miles from Ikot-Ekpene. I was in another part of the district at the time and visited this place about two weeks later, but both cases were said to have died; they were both adults, mother and daughter. The natives said they knew the sickness quite well and that it was Odonidap—S.S.

CASE IV.—A typical one in a male about fifteen or eighteen years of age was in the early somnolent stage; he came voluntarily from a place called Ikot Idagha on the Ikot-Ekpene Uyo road and not far from the above two supposed cases at Mbiakpa. He walked twenty-six miles in one day to Itu, where I was at the time. This patient told me that he knew quite well what sickness he had as there had been others sick with it in his town and all had died.

CASE II. was in quite another part of the district. It was reported to me by Miss Slessor (missionary) at Ikpe Ikot Nkun on the Enyong River. This case was a boy of seven or eight years of age and was said to have been somnolent for about five months. After much persuasion gland puncture was allowed and trypanosomes were found. The parents stated that he had only once been away from the town and that had been two or three months previously when they took him to the mission doctor at Itu. He had played with other children at the river a quarter to half-a-mile away from the town. *G. palpalis* is fairly numerous there.

In July of 1913 a man had died of sleeping sickness in the same town in a compound two or three hundred yards distant from that in which Case II.

lived. The town is surrounded by bush which comes close up to the houses all round the town, and I saw and caught several tsetse flies (*palpalis*) at the margin of the bush and particularly along a path which led to the river. About a hundred children were examined, 75 per cent. of whom had palpable cervical glands, none were prominently enlarged and in the great majority were probably caused by the *Impetigo capitis*, which was very common, and by yaws. The people, however, were too much afraid to allow gland puncture to be done. The villages in the neighbourhood were next examined :—Nkana, Ebam Ukot, Ibiona Eiwura, &c.

Nkana is a small village about four miles east of Ikpe Ikot Nkun and about a quarter of a mile from the Enyong River. The chief told me that he knew sleeping sickness quite well and that a few years ago some of his people had died of it. About two years ago they took two of the cases to the mission doctor at Itu, but they did not get any better. Since these two died there had been no case in his town. I examined about thirty people of whom twenty were children, all the children had shotty glands and most of them scalp eruptions. The gland juice of three without scalp eruption was examined and in one, a boy about seven years of age, a trypanosome was found (Case III).

Ebam Ukot is about four miles south-west of Ikpe, and it was at a small stream and swamp on the way to this place that the tsetse flies were so numerous, as I have already mentioned. There were very few people in this village, most of them ran away when I arrived, and the chief at first denied all knowledge of sleeping sickness; later, however, after a good deal of talk he said that he knew the sickness and that a woman had recently died of it. I went from house to house, but did not learn anything further.

At Ibiona Eiwura, south-east of Ikpe, the chief gave an account very similar to that of the chief of Nkana; he knew sleeping sickness quite well, several of his people had died of it two or three years ago, but no one was sick with it now.

A number of other villages were visited near Ududu Ikpe, on the high ground away from the Enyong River, and in these the chiefs and old men either denied all knowledge of sleeping sickness or said they knew it by report only.

In all these villages pigs and goats and a few sheep were kept.

At this stage I discovered that a report had gone about among the natives that I was travelling round examining people to be sent as labourers to Port Harcourt railway and they were terrified of that.

The main villages in Itu district were next visited and their story was quite different; according to the chiefs and headmen there had been no sleeping sickness for about 15 years, that just before the white man came to Itu a good many had died of it. Accounts quite similar to this I got in several villages. In none of the villages in this part of the district did I find pigs. I asked the reason and got various answers—that many years ago they kept them, but that they usually died in a month or two, or that they destroyed the farms, or that they were too dirty in the village; this last explanation was from a village with a mission school in it. The usual reason given, however, was that too many died and it did not pay them to keep them. Enlargement of glands, together with impetigo and yaws, was quite as common as in other places visited. In a few cases gland puncture was done, but no trypanosomes were found. At a place called Ibiacu Nyang Isang about three miles east of the middle of the Ikot-Ekpene Uyo road, the chief told me that he knew sleeping sickness very well and that long ago it was a bad sickness and that the last case he knew of died nearly five years ago.

At Ibiaku Itam in Uyo district and near the Ikot-Ekpene Uyo road I visited the Qua Ibo Mission; they had not heard of any case of sleeping sickness in the area of their mission work, but to assist me they made enquiry among the natives and found that they knew the disease and they brought me three suspicious cases: these were two small boys and a young man all said to be more or less somnolent. The young man had had enlarged cervical and axillary glands, but these had been excised by a native doctor some years previously. Some details of these three are given at the end of this report, but no trypanosomes were found and the termination of the investigation by the war prevented further examination.

While travelling this area 874 persons were examined for enlarged glands, 802 were children fourteen years and under and 72 were adults. 587 of the children had enlarged glands, 72·7 per cent. Four of the adults had shotty glands. Gland puncture was done in twenty cases only and three showed trypanosomes.

The blood of a number of pigs was examined and about one-third of them showed trypanosomes. A few goats were also examined, but none found with trypanosomes. One dog had trypanosomes. No other animals were examined.

DETAILS OF CASES.

CASE I.—Native male, 25 to 30 years of age, residing at Ibianang on the Itu Ikot-Ekpene road.

History.—Has been ill for three months with somnolence, fever, headache and general pains over the body.

Physical condition.—He is somnolent, has muscular tremors, staggering gait, deep hyperæsthesia and his skin is very dirty and covered by a dry eczema. His glands were not palpable, so gland puncture could not be done. Examination of blood films was negative for trypanosomes. A differential leucocyte count gave:—

No. counted	Eosino- phile	Mast cells	Myelo- cytes	Meta- myelocytes	Poly- morphs	Small Lymphocytes	Large Lymphocytes	Large Mononuclears
500	38	1	5	13	151	95	115	82
Percentages	7·6	0·2	1·0	2·6	30·2	19·0	23·0	16·4

CASE II.—Native about 8 years of age, male.

History.—Said to have been quite well until six months ago, when sleeping symptoms were noticed. No enlargement of glands is said to have been noticed until two months after somnolence commenced, then the glands on the left side of the neck became considerably swollen and remained so for about two or three months. While the glands were enlarged the patient was taken to the mission doctor at Itu. He frequently falls asleep with food in his mouth, he often has fever and he cannot walk. He had never been away from his native town—Ikpe Ikot Nkun—until taken to the mission at Itu. Although they knew what sickness the child had they did not tell the mission doctor.

Physical condition.—He is quite somnolent, but can easily be aroused up for 15 to 30 seconds, but can hardly keep his eyelids up. He cannot stand unsupported. There is muscular tremor and deep hyperæsthesia. He is emaciated, but not extremely so.

The cervical, axillary and groin glands are slightly enlarged. There is a diffuse dry eczema of the skin.

Trypanosomes were found on gland puncture being done.

CASE III.—Native, male, about 7 years of age, living at Nkana on the Enyong River near Ikpe.

History.—From about 2 years of age he had suffered from fever and did not grow fat like other boys of his age; enlarged cervical glands were never noticed.

Physical condition.—He is somewhat thin and weedy but otherwise appears healthy; cervical, axillary and groin glands are slightly enlarged and just easily palpable; one in the neck was about the size of a small bean and was punctured. One trypanosome was found in the smear made.

CASE IV.—Native, male, 17 or 18 years old, residing at Ikot Idagha on the Ikot Ekpene-Uyo road.

History.—He has been ill for about five months with fever, pains over the body but no headache, and began to be sleepy about a month ago. The cervical or other glands had never been noticeably enlarged. Had walked 26 miles the day I saw him.

Physical condition.—He looks dull and lethargic, his face looks puffy and there is a puffiness of the back of the left hand and wrist. Muscular tremor is present and is at times very marked. Deep hyperæsthesia is present. The knee jerks very much exaggerated and the toes are kept in a state of extension. The tongue is coated white and tremors present. The spleen is slightly enlarged and the liver tender though not enlarged. The skin is covered by a dry scaly eruption showing almost an imbricated appearance in places, there are many signs of scratching and a fair number of pustules probably due to the scratching. Emaciation is moderate.

Trypanosomes were fairly numerous in the gland juice.

This case was in hospital for some weeks and improved considerably under treatment with Liq. Arsenicalis.

SOME DOUBTFUL CASES.

(a) A boy about 10 years of age, at Ibiaku Itam near the Qua Ibo Mission, has been ill for some months with headache, fever and somnolence. There are enlarged cervical glands on both sides just below the ears, there is no scalp eruption or ear disease. There is no definite tremor or deep hyperæsthesia. There is an indistinct circinate erythema on the chest and upper abdomen. Emaciation slight. Gland puncture was done but no trypanosomes were found. Numerous sporulating subtertian malarial parasites however were found in the gland juice.

(b) An adult male, about 25 years of age, at Ibiaku Itam near the Qua Ibo Mission, has had headache and fever for five or six years and is said to be somnolent now. He had enlarged cervical and axillary glands which were excised by a native doctor some years ago. No muscular tremor, and deep hyperæsthesia doubtful. Emaciation slight. No glands can be felt, there are old scars where the glands are said to have been removed. Since no gland was available for puncture, blood films were taken but no trypanosomes were seen.

(c) A boy about 8 years of age, at Ibiaku Itam, has had fever and headache frequently and said to be very sleepy now. Duration not known. He is emaciated and looks dazed. He has muscular twitchings and deep hyperæsthesia is well marked. No glands can be felt. Blood examination negative.

With the small amount of evidence at one's disposal it is not safe to argue much from it, but it is noticeable that the known and suspected cases are all along the main road—Itu to Ikot-Ekpene and Ikot-Ekpene to Uyo and on the Enyong River—which is a much used native trade route, pointing possibly to infection being transferred from human being to human being via of course *G. palpalis*, which is everywhere. I am convinced that there are many more cases of trypanosomiasis than were discovered or heard of, the knowledge the people have of the disease over the greater part of the district points to that. In the part of the district included in a radius of about ten miles from Itu, the accounts of sleeping sickness from the natives seem to show that it has not been prevalent there for the last fifteen years or so, only the older people appear to know of it, whilst in other parts of the district many of the young people even know it.

There may be different explanations to account for this, but one thing I noticed is that no pigs are kept in the towns in this area. Considering the number of pigs infected with a trypanosome (almost all pigs according to Dr. Gallagher), which causes a considerable mortality amongst them, I think it might be worth while investigating the trypanosomes of the domestic pig in Nigeria, if that is not already being done.

Mr. Cruikshank, missionary at Ikot Offiong, nine miles south of Itu, after about thirty years' experience, says that he only remembers one case and that was about twenty years ago, and thinks he would be sure to know if cases occurred in his area. He tells me that pigs are not kept.

The spread of trypanosomiasis from human being to human being would appear to be quite likely when one takes into account the density of population, the condition of the houses and compounds so closely surrounded by bush, and the probability of the existence of many infected persons not in the sleeping stage and apparently quite healthy. The conditions in Eket district further south, where about four hundred cases of trypanosomiasis have been found, point the same way.

IV.—REPORT ON TRYPANOSOMIASIS.—OBUDU DISTRICT.

BY E. J. J. QUIRK, M.R.C.S. (Eng.), L.R.C.P. (Lond.),

Medical Officer, West African Medical Staff.

In 1911, the Provincial Medical Officer in his report on the Obudu district warned officers of the danger of trypanosomiasis, and recommended that the watercourses along the roads should be cleared of bush for 100 yards on each side. This was done as far as was practicable.

In 1912, Dr. Newport made a careful search for cases, but failed to find any; he stated, "I think in all probability that sleeping sickness does exist in this district and will continue investigations."

I have just completed a circular tour of the district with Mr. Hives, who, owing to his great influence with the natives, was able to give invaluable assistance.

A large number of natives were examined in each town visited, but no cases of trypanosomiasis were discovered; in those who were suffering from glandular enlargement, the blood examination was negative, and a local cause of the adenitis was always found. The examination of the local domestic animals has also proved negative.

In two towns, however, a very definite history of a previous epidemic was obtained, *viz.*:—

Bisheri.—A town situated 6 miles from Obudu station and 2,000 feet above sea level—the people farm in the plains below—the chief stated that, 40 years ago, five men died from a disease which, from his description, must have been sleeping sickness; since then he had not seen any similar cases.

Otato.—A dense bush country intersected by numerous rivers and streams. The chief stated that, when a boy, he was told by his father of an epidemic which had wiped out a large number of people; he described the symptoms, which tallied closely with those of sleeping sickness. He also stated that the Juju was invoked, and advised that the next victim of the disease should be thrown into the river. Another case did occur and this drastic remedy was adopted. No further cases had occurred within his knowledge.

This part of the district is very thinly populated and it is possible to travel for many hours without meeting with a single habitation or human being. It is quite possible that trypanosomiasis has in past years swept through this country and that the present population have acquired a certain amount of immunity.

The natives in every town were warned about this disease and the danger of the tsetse fly. The District Officer, Mr. Hives, instructed them to clear all the watercourses, to build their houses well away from the rivers, and to bring in any suspicious cases at once.

A real source of danger is the importation of cattle from the Northern Provinces. These cattle are brought to Obudu from Ibi via Katsena Allah; some are killed or bought locally, others are taken on to Ikom, Ogoja or Calabar.

All cattle brought to Obudu are examined by the Medical Officer and the percentage found to be infected with trypanosomiasis is approximately 18 (*vide* attached table).

As the supply of fresh meat is a great factor in preserving the health of the European staff, this traffic should not be discouraged, but at the same time every possible precaution should be taken to prevent the importation of infected cattle.

I am therefore of opinion that the Prevention of Diseases (Animals) Ordinance, 1908, should be applied to the Muri province, Northern Provinces, and that no cattle should be allowed to leave Ibi or Abinsi for the Southern Provinces without a medical certificate stating that they are free from disease.

RETURN OF EXAMINATION OF CATTLE IMPORTED FROM NORTHERN PROVINCES.

JANUARY TO JUNE, 1914.—OBUDU, S.P.

			Infected.		Healthy.		Total.
Bullocks	...	...	24	...	58	...	82
Sheep	...	...	2	...	15	...	17
Goats	...	...	6	...	70	...	76
Total ...			32	...	143	...	175
			<hr/>		<hr/>		<hr/>

V.—ANKYLOSTOMIASIS REPORT.

By T. B. ADAM, L.R.C.P., L.R.C.S. (EDIN.), L.F.P.S. (GLAS.),
D.P.H. (IRELAND) ;

Senior Medical Officer, West African Medical Staff.

In carrying out this investigation, 500 natives and 30 Europeans have been examined and observed, all of whom were seen, and resided in the Sapele district, or the sub-district of Kwale.

The sources from which subjects were obtained are (a) Sapele and Kwale gaol, (b) Government and Mission schools, (c) the general population, and (d) in- and out-patients of the Sapele hospital.

The Europeans examined were either Government officials or employees of the various commercial firms.

The distribution of the natives is as follows :—

(a) *Tribal*—

Kwale ...	...	...	...	...	...	182
Jekri ...	...	...	...	...	...	136
Sobo ...	...	...	...	...	...	133
Bini ...	...	...	...	...	...	19
Yoruba ...	...	...	...	...	...	11
Igbo ...	...	...	...	...	...	9
Sierra Leone ...	...	...	...	...	...	4
Kroo ...	...	...	...	...	...	3
Efik ...	...	...	...	...	...	1
Ijoh ...	...	...	...	...	...	1
Hausa ...	...	...	...	...	...	1
Total ...						500

(b) Age distribution.—Juveniles up to and including 15 years of age, and adults 16 years of age and over—

Adults ...	...	...	...	380
Juveniles ...	...	...	...	120

(c) Sex distribution.—

Males ...	...	...	...	455
Females ...	...	...	...	45

The examination included :—

(a) A complete physical examination of each person, with special attention to splenic enlargement.

(b) Microscopic examination of faeces (one-third objective for finding and one-sixth for confirmation).

(c) Examination of the blood when possible. This was done in 117 cases, and consisted of :—

- (1) Fresh smear examination (one-sixth and one-twelfth O.I).
- (2) Haemoglobin test by Tallquist scale.
- (3) Thin films stained by Romanowsky (Leishman), examined for parasites, and used for differential count.

In the microscope work No. 4 eyepiece was used throughout.

The main results of this examination are shown in the subjoined table, which refers only to natives.

	Total.	Infection.	Well.	Anæmic.	Anæmic and thin.	Anæmic and emaciated.	Other intestinal parasites.	Intercurrent disease.
Adult male	353	—	—	—	—	—	—	—
Ankylostome	—	245	128	70	37	10	168	28
Malarial	—	11	9	1	1	—	3	—
Ankylostome and malarial together	—	66	21	31	14	—	35	4
No infection	—	31	30	1	—	—	11	2
Adult female	27	—	—	—	—	—	—	—
Ankylostome	—	18	6	7	4	1	12	3
Malarial	—	2	2	—	—	—	1	—
Ankylostome and malarial together	—	6	—	4	1	1	5	—
No infection	—	1	1	—	—	—	1	—
Juvenile male	102	—	—	—	—	—	—	—
Ankylostome	—	41	20	6	15	—	25	2
Malarial	—	4	2	—	2	—	2	—
Ankylostome and malarial together	—	51	10	11	30	—	36	4
No infection	—	6	6	—	—	—	1	—
Juvenile female	18	—	—	—	—	—	—	—
Ankylostome	—	3	3	—	—	—	3	—
Malarial	—	—	—	—	—	—	—	—
Ankylostome and malarial together	—	13	3	3	7	—	13	—
No infection	—	2	2	—	—	—	—	—
Total	500	—	—	—	—	—	—	—
Ankylostome	—	307	157	83	56	11	208	33
Malarial	—	17	13	1	3	—	6	—
Ankylostome and malarial together	—	136	34	49	52	1	89	8
No infection	—	40	39	1	—	—	13	2

1. The investigation reveals the presence of ankylostome infection in 443 out of 500 natives, or 88·6 per cent.; 191 showed no sign of suffering from the infection (or 43·1 per cent. of those infected), while 150 might be said to be suffering from ankylostomiasis uncomplicated by any demonstrable malarial infection (33·86 per cent. of those infected), or 30 per cent. of the total number examined, and a further 102 suffered from a combined malarial and ankylostome infection (23 per cent. of those infected), or 20·4 per cent. of those examined.

2. The actual ill-health attributable to the ankylostome infection alone is 30 per cent. (150 out of 500).

The disability is the same, but may be sub-divided as follows:—

(a) Those able to do ordinary work, but unable for sustained effort, 83, or 16·6 per cent. of the total examined.

(b) Those only fit for light work, 56, or 11·2 per cent. of the total examined.

(c) Those totally unfit for work, 11, or 2·2 per cent. of the total examined.

3. In addition to those mentioned in para. 2, there were 136 in whom were found evidences of both a malarial and an ankylostome infection, 27·2 per cent. of the total examined. Of these, 34 did not appear to have suffered in health (25 per cent. of those with double infection) and were going about their ordinary work without inconvenience. The remainder may be sub-divided into classes (a), (b) and (c), as indicated before.

(a) 49 suffered in the first degree (36 per cent. of those with double infection), or 9·8 per cent. of the total examined.

(b) 52 suffered in the second degree (38·2 per cent. of those with double infection), or 10·4 per cent. of the total examined.

(c) 1 was wholly unfit for work (0·8 per cent. of those with double infection), or 0·2 per cent. of the total examined.

In order to ascertain the relative responsibility of the malarial parasite and the hook worm, I have worked out the effects noted in each infection separately (taking only those cases with a single infection), but I fear the numbers are scarcely sufficient to carry any material conviction.

In 307 cases of ankylostome infection :—

157 are well	...	...	...	approx. 51 per cent.
83 suffer in the first degree	...		„	27 per cent.
56 suffer in the second degree	...		„	18 per cent.
11 suffer in the third degree	...		„	4 per cent.

In 17 cases of malarial infection :—

13 are well	...	...	...	approx. 76·5 per cent.
1 suffers in the first degree	...		„	6 per cent.
3 suffer in the second degree	...		„	17·5 per cent.
0 suffers in the third degree	...		„	0 per cent.

It would appear from this that disability and ill-health are caused to a greater extent and to a more serious degree in ankylostomiasis than is the case in malarial infections, approximately in the ratio of two to one. This however requires modification. From my experience I venture the opinion that the dire effects and high mortality of malaria are found in infancy and early childhood, while the ravages of ankylostomiasis are almost exclusively in later life. Unfortunately only three of the 500 were under 5 years old (the period during which mortality from malaria is at its highest), so that malaria appears in a more favourable light than is actually its due.

4. Only 120 children were examined, of these :—

108 were found to harbour the hook worm, 90 per cent. of the children examined.

55 had evidence of malarial infection, 45·8 per cent. of the children examined.

44 had the ankylostome infection alone, 36·6 per cent. of the children examined.

4 showed evidence of malarial infection only, 3·3 per cent. of the children examined.

64 were the subjects of both infections, 53·3 per cent. of the children examined.

8 appeared to be entirely free from any infection, 6·6 per cent. of the children examined.

Evidence of impaired growth was found in 7 cases, in 1 from malarial infection alone, and in 6 where both infections were present.

Impairment of health considered under the three degrees mentioned before gives the following results :—

46 were well	...	...	...	38·3 per cent. of the 120.
20 suffered in the first degree	...			16·6 per cent. of the 120.
54 suffered in the second degree	45			per cent. of the 120.

It must be remembered that these were almost entirely the survival of the fittest from the first 5 years of life. (From careful work during the last 5 years I have formed the opinion that the ankylostome infection is extremely

rare in children at the breast, *i.e.*, during the first 3 years of life, while during this period malaria is very common and shows a high mortality.)

Observations made on 30 Europeans.

In no case was there any ankylostome infection, but in three the eggs of *Tricocephalus trichiurus* were found, and in one *T. saginata* was found.

In 12 there were found evidences of malarial infection and these were all impaired in health, though able to continue at their work. It is not possible to say that this ill-health can be at all fairly attributed to the malarial infection.

5.—*Preventive measures.*—In 1910 and 1911 I devoted much time and attention to the application of preventive measures, and experiments with these, and supplemented this work in 1914 again, on my return to Sapele. For convenience I give the results together and do not separate the work done since the receipt of the circular.

Under this heading, collection, treatment and disposal of excreta were dealt with. In Sapele where the work was carried out, the experimental field was presented by the local prison, which accommodated from 135 to 150 occupants. There was a land latrine in the prison yards, but the prisoners also freely used a water latrine in the immediate vicinity. The water latrine was made the subject of investigation first, on account of the fact that the prisoners were sent to wash within 50 yards of it. Experiments were carried out (*a*) to ascertain whether eggs or embryos in an active state were present in the water, or in the mud at the bottom of the river, and (*b*) to learn the effect, if any, of fish on the numbers of eggs or embryos in the water.

Water was collected in buckets by the prisoners while they washed in the river. The water in each bucket was treated with salt to raise the specific gravity sufficiently to float any helminth eggs present. The buckets were allowed to stand for some hours, and the scum on the surface carefully collected. The collected scum was centrifugalised, the fluid decanted, and the deposit carefully examined.

(*a*) Fresh smears—eggs of ankylostome, of *Ascaris lumbricoides*, and of *Tricocephalus* were found.

(*b*) Some of the deposit was washed through muslin, with fresh water, again centrifugalised, and the resulting deposit cultivated on lint in a petrie dish.

Examined on the fifth day a number of embryos were found.

The mud at the bottom of the river was also subjected to examination, by washing through muslin, centrifugalising. Fresh smears and cultures giving the same results. Of six such smears however, only two were positive, and eggs were much harder to find in the smears.

(*b*) As there were abundant fish in the water, around and beneath the latrine, it seemed reasonable to think that they must destroy a large number of eggs. To test this, a large net was obtained, placed in the water all round the latrine, drawn close and finally fixed to the supports of the latrine at high water. Low water leaves the latrine dry, so that numbers of fish were easily caught in this way. The fish caught were dissected, and the contents of the entire alimentary tract most carefully examined.

(*a*) Fresh films—negative result.

(*b*) Washing through linen—

(1) Filtrate smears—negative.

(2) Deposit on filtration—smears negative.

(*c*) Cultures on lint—negative.

Two hundred fish were submitted to this examination, with the above results. It was observed however that faecal matter was not found in the mouth, nor in the stomach, and I concluded from this that the fish fed only upon undigested particles separated out from the faeces.

It was now apparent that the use of this latrine was fraught with danger to those bathing in the vicinity. Later experiments at points remote from the latrine also gave positive results, and in consequence river-bathing was stopped so far as the prisoners were concerned (possibly the positive though variable results all along the river bank between the prison and the native town were in some measure due to the fact that the native does not confine his attentions to the one and only point at which there is a latrine erected). Examination of the water and mud on the opposite bank of the river at points where, owing to dense bush, there is no landing, were entirely negative in their results.

Attention was now directed to the land latrine and the prison latrine used throughout for the experiments. The first trial was in the use of chemicals combined with shallow trenching. Faeces were collected in the usual drum which is commonly in use. Urine was of course ready mixed in the faeces. To each drum was added (*a*) 4 qrts. of Cyllin lotion 1-160, or (*b*) 4 qrts. of an acid solution of corrosive sublimate 1-1,000 with 20 minims of pure hydrochloric acid added. These two lotions were not used in the same drum, but during the following week with (*b*) lotion. After the lotion was added the contents of the drum were well stirred, and before trenching 12 samples were taken from each, the mixture being stirred between the taking of each sample. Trenching was then carried out in three series of trenches (1) 6 ins. deep 18 ins. wide, (2) 12 ins. deep 18 ins. wide, and (3) 18 ins. deep and 18 ins. wide. The trenches were dammed at 3 ft. intervals, and the contents of one drum placed in a 3 ft. section and immediately covered in with soil.

Examination of samples.

Fresh smears, all positive, containing ankylostome eggs in abundance.

Cultures, 17 positive out of 72 (9 positive out of 36 from Cyllin-treated faeces, 8 positive out of 36 from corrosive-treated faeces).

Examination of trenches.

The surface soil was treated in exactly the same manner as was the mud from the river bottom. Samples taken immediately after covering in, and on each subsequent day till the 22nd, gave the following results.

In the case of the 6-in. trenches a negative result was obtained till the 8th day, when 5 embryos were recovered, which closely resembled those of the ankylostome. On each subsequent day a positive result was obtained. In the 12-in. trenches the result was negative till the 11th day, when a positive result was obtained, and on the 12th, 14th, 16th, and subsequent days. In the 18-in. trenches a positive result was obtained on the 17th day and subsequent days.

In the trenches treated by the corrosive, the only variation from above in 12-in. trenches, no positive result was obtained till the 16th day.

In addition to the doubtful nature of this method, the offensive character of the work of mixing rendered it necessary to abandon it as not sufficiently practical.

Incineration and shallow trenching was next tried, after an attempt at drying the faeces was abandoned as being also too offensive. For this

experiment an incinerator was erected at a cost of the prison labour only. The type built was a modification of the "Army Field Incinerator." The modifications consisted in making a platform 9 ft. by 9 ft. by 18 ins. deep, and cutting the trenches in the platform. The trenches were modified in that they were shaped like a Maltese cross, were narrower at the point of intersection than the Army pattern, and were given a gradient from the centre to the edge, making the trenches deeper at the outlet than at the centre by 3 ins. By these modifications the draught was increased, and the clearing of the trenches simplified. A shed was erected over it, and extended to a distance of 20 ft. to one side. This afforded protection from the rain, and provided a dépôt for the separation of the combustible from the incombustible rubbish.

The incinerator was started with wood from the surrounding bush, and was fed mainly with the rubbish from the European factories and the Government beach.

It speedily became evident that the fæces had to be obtained as dry as possible. To accomplish this end, ordinary kerosene tins at 2*d.* each were purchased, and placed in the latrine in pairs instead of the usual drum. To make these more effective, and ensure success by disturbing the native as little as possible from his natural squatting position, these tins were inset in pairs in the ground with the tops level with the ground surface. The opening for the tins was lined with a 6-in. layer of well puddled clay on all sides and on the bottom. By this means separation of fæces from urine was easily accomplished, and the now comparatively dry fæces presented no difficulty in incinerating. The ash from the incinerator was disposed of on the prison farm. In order to obtain some idea of the efficiency of this method in preventing re-infection, observations were made on 40 prisoners. The prisoners selected for this were all cleared of infection by treatment with Thymol in large doses on three separate occasions, and were examined two weeks later, and on two subsequent occasions at intervals of three days. All were successfully cleared of the infection. These prisoners were only allowed to use the prison latrine, and they were supervised to ensure cleansing themselves with a little fibre and cyllin lotion provided. They were also made to clean their hands after use of the latrine and at all times before meals. Two prisoners were placed on the latrine to supervise, in order at the same time to ensure cleanliness, and to see that the pans were used the right way. These men were kept up to the mark by repeated inspections.

Twenty of the prisoners were made to dip their feet in thick pitch, twice a week, while in the remaining 20 this was omitted.

The fæces of these prisoners were now examined twice a week for a period of 18 weeks, with the following results:—

Feet untreated—

Seven discharged before expiry of the 18 weeks, but showed no recurrence up to date of discharge.

Five showed recurrence at different periods, the earliest being 12½ weeks from the beginning of the test.

Eight showed no recurrence.

All remained fit during the period.

Feet treated with pitch—

Three discharged within a few weeks.

Seventeen showed no recurrence.

All remained fit during the period.

During this time all prisoners were made to wash in the prison, and the water used was treated with Cyllin, and as a further safeguard washing water was obtained from the middle of the river.

It is also of interest that during nine months in which active treatment, and prevention, were carried out, the incapacity for labour fell from 37 per cent. to 5 per cent.

The incineration of fæces worked successfully for a period of six months, that is until the expiry of my tour.

In 1914 the double pan system was again tried in the prison, but instead of incineration, the excrement was directly trenched in shallow trenches 18 ins. by 18 ins. A layer of lime, approximately $\frac{1}{4}$ to $\frac{1}{2}$ in. thick, was laid on the top and the trench immediately closed. Careful examination of the surface soil as before failed to reveal any embryos, though carried out twice a week over a period of two months.

ROUTINE MEDICINAL TREATMENT.

This was carried out in the prison, owing to the greater certainty of administration, as well as facility in observing results. The drugs tried were, thymol in 10 grain doses, and beta naphthol in 15 grain doses.

Thirty prisoners were given, daily, a 10 grain dose of thymol after the evening meal. On the expiry of three months the treatment was stopped for two weeks, at the end of which time the stools were examined on three separate occasions at intervals of three days.

Twenty-two were found to be negative.

Eight others still showed infection (slight). The eight were put in treatment for a further month, and while two were discharged not quite cured, three were cured and three still showed infection to be present. All the prisoners so treated showed material improvement in health.

Thirty prisoners were treated with beta naphthol, in 15 grain doses each evening after food.

Treatment was stopped after two months, and examination of the fæces carried out on the expiry of a two weeks' interval, the same procedure being carried out as in the Thymol experiment.

Seventeen were found to be negative.

Twelve still had an infection.

One escaped from prison without examination.

At the end of another month of treatment—

Three more were negative.

Nine still retained the infection.

Material improvement was noted in the health of all these prisoners.

It should be stated that during this time a 10 grain dose of quinine was given to each prisoner once a week.

In conclusion, I would like to express the belief that routine medicinal treatment combined with attention to personal hygiene, and adequate collection, treatment and disposal of nightsoil, would be found to repay handsomely the trouble taken, in a very material reduction, not alone of the ankylostome infection, but also of the dysentery so frequently associated with it, and from which there are repeated periodic outbreaks with an attendant high mortality.

VI.—NOTES ON SOME INTERESTING CASES.

BY A. E. NEALE, M.D., B.S. (Durham), F.R.G.S.

Medical Officer, West African Medical Staff.

Hæmoglobinuria.

I would like to mention a curious phase in connection with the cases of hæmoglobinuric fever which have occurred in Ibadan since I took charge.

The first case of hæmoglobinuria was in a Syrian child aged 5 years. There was no temperature, and on the second day hæmoglobin had disappeared from the urine, and only a faint trace of albumen remained. On the third day the child complained of difficulty in swallowing. On examination I found an extremely ulcerated throat, with dirty white sloughs. I prescribed a weak carbolic mouth wash and gargle, and painted the ulcers with iodine. On the fourth day the throat and inside of the mouth round the molar teeth presented a typical condition of *cancrum crïs*. I therefore had the patient placed on the table. I removed all the sloughs possible with forceps, and swabbed well after with the following:—

Iodine crystals	...	...	gr. 4
Menthol	...	...	gr. 5
Paroleine	...	...	oz. 1

From the condition of this child's mouth and throat, I gave the patient about two days to live; but the symptoms cleared up most rapidly, and with the exhibition of tonics, an uninterrupted recovery took place.

I mention this case here on account of subsequent events.

Case 2.—This was a case of hæmoglobinuric fever in a European official. This occurred four miles from my residence, and on account of the severity of the case and the danger of moving the patient, I treated him in his quarters, utilising the services of one of the Hospital Nurses.

On the disappearance of hæmoglobin from the urine, this patient complained of stiffness in the throat and angle of the jaw. No ulceration had taken place, and the symptoms readily yielded to treatment.

Case 3.—A German Prisoner of War. After hæmoglobin had entirely disappeared from the urine, the mouth and throat assumed a typical *cancrum oris* character. With the other two cases in my mind, the coincidence was remarkable.

I therefore had swab cultures taken, which were incubated and examined by Dr. Connal at the Medical Research Institute. Nothing was found beyond the usual Streptococci, &c.

This was a most intractable case, and the patient was in a very low state for some considerable time.

While writing this report, another case has come under my care—a Brazilian. He came to me suffering from hæmaturia. On microscopical examination, I found in the urinary sediment *Bilharzia* ova. No sooner had his urine become normal again, than he developed a similar condition of throat to the cases already referred to. Although this case does not enter into the 1914 Returns, it is interesting to note, in comparison with the others.

No other cases with these symptoms have been observed. It is at least a very curious coincidence, the symptoms only showing themselves in either hæmoglobinuria or hæmaturia.

Porocephalosis.

One native was brought to Hospital in extremis. He died immediately on admission, before I was able to see him.

A post-mortem examination revealed a liver with a number of small yellow spots over the surface. These on examination were found to be *Porocephalus* larvæ. The right lung was very adherent at the apex, whilst the base was very acutely congested. The left lung was normal. The post-mortem specimens were sent to the Medical Research Institute at Yaba.

I understand that a case of this was reported from this station last year. In the present case I have been unable to obtain any of his symptoms before admission. He was only brought to me because he was in a dying state. The report from the Director of the Medical Research Institute stated that the liver, spleen and kidneys were normal microscopically except, of course, for the fibrous tissue and infiltration round the larvæ.

There is one more case I would like to allude to. It is not from this district, but occurred at Calabar, when I was in charge of the hospital there. I refer to it in case it may not be quoted in the Calabar Report.

Case.—British subject, male, single, aged 26 years, by occupation an Agent.

This patient was brought down river in a special launch from Ofun Atam. He arrived in Calabar on Sunday, 7th June, 1914.

History.—Family history good, father, mother and six brothers all living and well.

Previous illness.—Hydrocele in England after one tour on the Coast. For this, he underwent an operation for radical cure, with successful result.

First trip to W. Africa was in November, 1909, remaining two years in Opobo. He then remained at home on leave for 4½ months, during which period he underwent the operation above alluded to.

Second trip commenced 18th March, 1912. He remained at Calabar for two months, and then on to Oron for 15 months. He then went home on leave for three months.

Third trip.—Sailed on 17th September, 1913, disembarked and remained at Calabar for two months. He then proceeded to Ofun Atam, where he has remained up till the time he was sent to Hospital.

During first tour he had two small goes of fever.

During second tour he had no sickness of any sort.

During third tour (the present) he had no sickness until the present illness.

Condition on admission.—Paresis of both legs. Pain in the lumbar region. Knee reflexes absent. Ankle clonus nil. Cutaneous sensation not impaired. Very slight fluid in right knee joint. Quite unable to walk and

can only turn over in bed with the greatest difficulty. Could, by holding on to a chair, "shuffle along." One leg drags behind the other. Sudden movement causes sharp pain to shoot down the leg, apparently arising from the position of the sciatic nerve, deep in the buttocks.

There are two small glands on the left side of the neck, behind.

Temperature 98·4° F., Pulse 75, Urine s.g. 1010, alkaline, no albumen.

Various examinations of the blood taken at different hours of the day revealed no parasites. An enema had to be given on the second day. All stools were kept and examined. They contained an extraordinary amount of totally undigested food—totally unmasticated. It would appear that all food—meat, vegetables and everything—had been swallowed whole. Having ascertained this fact, I elicited from the patient that there was a history of his having eaten enormous quantities of food for wagers in the past.

Microscopical examination of stools was made daily. The ova of *Ascaris*, *Ankylostome* and *Trichocephalus* were found. The ova of the latter were doubtful at first, owing to the stool having lain many hours before examination (having been passed early in the night), but this was subsequently confirmed by the finding of the worm itself.

In addition to the above, *Hymenolepis* was found on four occasions. Various anthelmintics were administered, over a considerable period, and daily examinations continued by microscope. Albumen continued in the urine until the 26th June—21 days from admission.

The knee jerks returned slightly on the 18th June, and on the 19th were almost normal. Albumen decreased daily.

Patient became more cheerful, but continuous wet days seemed to aggravate the sciatic pain.

A few slight boils appeared on the legs on the 26th.

Every care was taken to see that all food was properly masticated. He still bolted solid food and vegetables if not watched.

From the 26th to the date of his departure, no albumen was found. The pains in the back became aggravated on wet days. This is a curious case, and most interesting. Several other assistant agents have been ill at Ofun Atam with certain leg affections. Two were called beri-beri. They ended fatally. I have enquired about drinking water, and find that neither boiling nor filtering have been carried out properly. This station has acquired a very bad name with the trading community.

The patient was invalided home on July 1st.

I have noticed in cases who attend the dispensary a number of natives who show symptoms of pellagra, *i.e.*, the digestive symptoms:—Loss of appetite, dyspepsia, stomatitis, enlargement of parotid glands, tongue showing much shedding of epithelium, pain at the pit of the stomach, and sometimes diarrhoea.

The chief suspected biting fly in the spread of pellagra in this district is *Stomoxys calcitrans*. Simuliidæ are also about, but in a much more limited zone than *S. calcitrans*. In view of present theories I think these points may be of interest.

VII.—FIFTEENTH ANNUAL REPORT ON THE WORK DONE IN THE CHEMICAL LABORATORY FOR THE YEAR 1914.

BY W. RALSTON, B.Sc. (LONDON), F.I.C. ;
Government Chemist, Nigeria.

This report refers to a period of 10 months nearly, from 1st January till 20th October, after which I was absent on the usual leave.

2. The samples received may be classified as under :—

Kind.	Department Submitting.	No.	Total.
Gin	Customs	23	125
Rum	Customs	7	
Wines	Customs	6	
Whiskey and alcohol	Customs	4	
Perfumes and drugs	Customs	60	
Provisions, matches	Customs	25	
Water	Harbour Works, Political	5	12
Water	Railway, Marine, Medical	7	
Chemico-legal	Police, Judicial, Coroners	21	21
Miscellaneous	Commercial Intelligence, &c.	13	13
			171

3. *Customs Work*.—Of these 125 samples, 96 were from Lagos, 27 from Sapele and 1 each from Onitsha and Degema. The examinations were of the usual routine nature mentioned in former reports.

4. *Water Analysis*.—Eight samples were examined with a view to their suitability for boiler use in the Harbour Works, Railway and Marine Departments, 2 samples were proposed supplies for drinking water, and 1 was examined for salinity on behalf of the Yellow Fever Commission. The remaining sample was a mineral water derived from the Keana Salt Workings in the Northern Provinces, the chief mineral present being common salt.

5. *Chemico-legal Work*.—This arose from the usual post-mortem cases, cases of suspected poisoning, counterfeiting coins, vitriol-throwing and murder. In connection with one case it was necessary to be present in Court at Lagos on five days.

6. *Miscellaneous Work*.—The District Officer at Obudu sent a sample of China Clay for analysis, and the Resident at the Keana Salt Workings submitted a sample of the soil there. This latter was found to be impregnated with about 2·5 per cent. of common salt.

As a complaint had been made by merchants in England about the amount of oil in Nigerian palm kernels, the Commercial Intelligence Officer suggested an analysis of specially selected samples for comparison. Ten samples from different places in Nigeria were submitted and the results showed none to be abnormal. The normal moisture varied between 3·6 and 3·9 per cent., and the percentage of oil varied from 44·5 to 51·6.

A few experiments were made for the Agricultural Department with some Cotton Plant leaves affected with the "Mosaic Disease," to discover whether or not the disease could be ascribed to the presence of some oxidising enzyme

which exercised an inhibitory influence on the action of diastase. So far as the experiments went the conclusion was negative.

7. *General Remarks.*—The decrease in the number of Customs samples this year has had a corresponding effect on the amount of clerical and other general work of supervising the Laboratory. One of my native assistants has been changed as having proved unsatisfactory, but the other one has been fairly useful through showing some aptitude in carrying out various chemical operations.

VIII.—REPORT OF THE GOVERNMENT DENTIST ON WORK DONE IN THE SOUTHERN PROVINCES OF NIGERIA FOR THE YEAR 1914.

LAGOS.—JUNE 13TH TO AUGUST 5TH AND NOVEMBER 9TH TO DECEMBER 3RD.

ORDINARY OPERATIONS.

Europeans.	Nature of work.	Natives.	Nature of work.
84	Fillings 72	79	Fillings 33
	Extractions 15		Extractions 68
	Other operations, scalings, dressings, replacing crowns, etc. 42		Other operations, scaling, dressing, replacing crowns, pivots, etc. 24

EXTRAORDINARY OPERATIONS.

Europeans.	Nature of work.	Natives.	Nature of work.
14	Artificial dentures, crowns, and repair thereto. Fees paid, £23.	8	Artificial dentures, crowns and repairs thereto. Fees paid, £18 11s.

IBADAN.—OCTOBER 24TH TO NOVEMBER 6TH.

ORDINARY OPERATIONS.

Europeans.	Nature of work.	Natives.	Nature of work.
18	Fillings 23	5	Fillings 2
	Extractions 14		Extractions 5
	Other operations, scaling, dressings, replacing crowns, pivots, etc. 6		Other operations, scaling, dressing, etc. 3

EXTRAORDINARY OPERATIONS.

Europeans.	Nature of work.	Natives.	Nature of work.
2	Artificial dentures and repairs thereto. Fees paid, £8 0s. 6d.	1	Artificial denture. Fees paid, £2 2s.
Total 118	—	93	—

I arrived in Nigeria from the Gold Coast on June the 11th, 1914, and all the stations included in the Nigerian itinerary have been visited in the allotted time except Calabar and Warri, and a large amount of useful work has been done. Of the total number of fillings inserted for European officials, one hundred and two* were amalgams, thirty were oxy-phosphate or oxy-chloride cements, fourteen were permanent gutta-percha, while six were porcelain inlays inserted by rod and bur method. Many of the teeth filled involved somewhat tedious root treatment, and on this account many officials paid several visits. There were eighteen cases* in which nitrous oxide was used for the painless extraction of teeth. Local anæsthetics were also used but not to any extent. The general condition of the mouths examined was good, and I am glad to be able to report that in only a few cases were there signs of gross neglect. Extraordinary operations show a big increase over last year. Many of these were repairs or additions to existing dentures, and officials greatly appreciate the convenience of having their repairs executed on the spot without incurring the loss of time, and not infrequently injury to health, involved in sending them home. Many officials also availed themselves of my presence in their station by having spare dentures or other apparatus made in case of accidents.

The work performed for native officials has been extremely interesting. Unfortunately when the time at one's disposal is so short, and when so much practical work has to be done, there is little opportunity for the careful examination of patients and for the collection of data which might prove of great interest and value. The actual dental treatment, however, so far as it has been possible to carry it out under the disadvantageous conditions, has been most successful, and to the very great benefit of those whom it has been found possible to treat.

H. F. HARDIE,
Government Dentist.

IX.—GENERAL DESCRIPTION OF LAGOS ISLAND.

BY J. M. DALZIEL, M.D., C.M. (EDIN.), B.Sc. PUB. HEALTH (EDIN.),
D.T.M. (LIVERPOOL),

Sanitary Officer, West African Medical Staff.

1.—GENERAL DESCRIPTION OF SITE.

Lagos Island is a sand and mud bank surrounded by lagoons fringed with mangroves. Drainage has helped to improve the surface and is expected to do more, but swamps on the east side encroach on the inhabited portion, and the edges of the island in the thickly populated western part are low-lying in spite of some degree of reclamation, and remain wet and unclean for several months of the year.

The part of the island west of Macgregor Canal and Five Cowrie Creek is known as Lagos Town and covers about 900 acres, with a population of about 60,000 and some 900 native dwellings, of which only about 400 have an upper storey.

The density of population per acre averages 60, but rises as high as 170 in some sections.

* Includes cases treated in the Northern Provinces also.

Nearly half the population of Lagos Town is Mohammedan, and four-fifths are Yoruba.

The native town is over-crowded and has never been laid out on proper lines in accordance with approved plans.

The main business premises and Government offices, etc., are on the Marina or frontage to the lagoon on the seaward side, where sand reclamation and a solid sea wall maintains the integrity of the foreshore and allows of drainage.

Lagos Municipal Area includes the Island of Lagos, Iddo Island, Ebute Metta and Apapa on the mainland, and Victoria Beach. For sanitary administration the Municipal area is divided into five districts, four of which comprise Lagos Town, the fifth including Ebute Metta, Apapa and the outlying villages, etc., on Ikoyi Plains and Victoria Beach.

Including the outskirts within the Municipal boundary, the total area is about 18 square miles. The area of the towns proper is about 2 square miles.

The chief streets are of laterite, but the increase of motor traffic during the past three years has caused more attention to be paid to the construction of metalled roads.

Most of the side streets do not exceed 15 ft. in width.

2.—ALTITUDE.

Lagos and Ebute Metta range in general altitude from sea level to about 10 ft. The highest point on Lagos Island is about 20 ft., and many sections of the native town are, even at several hundred yards from the water's edge, only a few inches above the lagoon.

3.—SYNOPSIS OF METEOROLOGICAL DATA.

Lagos Observatory.

Compound returns for 10 years, 1904–1913 :—

Average mean temperature	...	80·4°.
Highest maximum	... ..	99·5°, 17th December, 1913.
Lowest minimum	... ..	65°, 14th January, 10th and 27th January, 1911.
Highest humidity at 9 a.m.	...	97 per cent., 2nd, 20th and 26th July, 1907.
Lowest " " 3 p.m.	...	28 per cent., 26th January, 1911.
Annual rainfall...	...	69·11 ins.
Highest rainfall in one year	...	87·08 ins. (1911).
Lowest " " " "	...	40·50 ins. (1912).
Highest " " " day	...	8·92 ins., 19th June, 1904.
General direction of wind	...	S.W. prevailing, N. during harmattan.
<hr/>		
Highest recorded rainfall	...	114·8 ins. in 1901.
Highest in one month	...	31 ins. in June, 1894.

More than half the total rainfall occurs in May, June and July. Very little rain falls from November to February, about 4 ft. 6 ins., and the month of December or January (sometimes both) is often rainless.

4.—WATER SUPPLY.

Hitherto entirely by rain-water tanks and wells.

Wells.—2,476 on private premises (including Ebute Metta), and 101 public wells. Some are brackish and not used for drinking; many people in the

western part of the town buy water brought from surface wells at Apapa. Practically all wells show pronounced bacterial pollution. Fourteen public wells have pumps.

Tanks.—Seven hundred and two in number, mostly of corrugated iron, and about 150 of concrete; the majority are of about 400 gallons capacity. A new and up-to-date water supply conveyed from Iju Valley, about 19 miles away, with settling tanks and sand filter beds, is nearing completion. This provides for a supply of 2 million gallons or more in the 24 hours. Street fountains at various points have already been put in position throughout the town and pipe-laying has been practically completed.

5.—SEWERAGE SYSTEM.

At present a conservancy system by pails of approved pattern exists, with public pail latrines on land and a few waterside latrines at the edge of the lagoon. A contractor removes pails from Government quarters and offices and from public latrines to two depôts. In certain districts it is compulsory for occupiers to rent sanitary pails, which are also privately removed to the depôts, and from these they are conveyed by tramway at night to a dejection jetty on the lagoon between the town and the sea. The night-soil from other native houses is deposited in the lagoon at permitted points.

Recent harbour works and opening of the port to ocean shipping have rendered the present methods increasingly open to objection, and a new hydro-pneumatic ejector system to serve the whole population, with several depôts throughout the town and four ejector stations discharging to the sea away from the harbour, is in view at a capital cost of £34,000.

The annual cost of sewage disposal is now about £4,000, of which about £1,000 is required for the Sanitary Tramway, and the remainder for the conservancy contract, labourers, upkeep of public latrines, etc.

Scavenging, including street sweeping, emptying public dustbins and incineration of refuse, costs about £5,100.

Sanitary Inspection (for prevention of mosquito breeding, cleanliness of premises, etc.) along with *Meat Inspection* and associated labour costs about £2,140.

6.—GOVERNMENT OFFICES AND BUILDINGS.

Quarters occupied by European officials number roughly 85 (excluding Apapa, Ebute Metta and Yaba).

Non-officials occupy about 65 houses.

European Officials Houses.

Government House is a large three-storeyed building of brick and concrete, with corrugated iron roof, standing within grounds of several acres, facing the Marina.

Other Officers' Quarters.

(1) Specially built as residences; in general type two storeyed, with walls and columns of brick or concrete, or both, concrete or tiled ground floor, and roofs of corrugated iron or of eternite slate or tiles.

(2) Living rooms above offices 9 or 10 in number.

(3) Native-built houses rented, five; or purchased and adapted or added to, five or six.

- (4) Rest-houses, two, or sets of quarters in one building, two, for junior civilian officers (military, two excluded).

Offices and other Government Buildings.

(1) New public offices, two storeyed, forming three sides of a square open to the Marina and back to Broad Street; brick walls with concrete columns and ground floor; built and occupied as completed during the past four to six years; accommodates offices of the Administrative Departments, Treasury, Marine, etc. Separate offices, etc., of other Departments are:—

(2) *New Printing Office* in Broad Street, adjoining the last.

(3) *New Post Office* on the Marina (with Telegraph Offices away).

(4) *Offices of the Medical Department.*

(5) *Lagos Prison.*

(6) *Drill Hall*, in Catholic Mission Street, about to accommodate the Municipal Board of Health.

(7) *Survey Department* in Broad Street, with *Observatory.*

(8) *P. W. D.* with *Yard* on the Marina to Broad Street, and new *Workshops* in Wesley Street.

(9) *Marine Transport Office.*

(10) *Sanitary Department* with *Registration Office*, etc.

(11) *Customs* offices, warehouses, etc.

(12) *Police Department* at Tinubu Square; police stations through the town, etc.

(13) *Law Courts*, Tinubu Square, on the same site for many years; present building with domed zinc roof about 10 years.

(14) *S. N. Regiment*, *Mess Offices*, etc., at the Race-course; *Barracks* at Ikoyi Plains.

(15) *King's College.*

(16) *Two Mohammedan Schools.*

(17) *Colonial Church.*

(18) *Hospitals*—*Lagos Hospital. Infectious Diseases Hospitals* at Ikoyi, *Quarantine Station* (across the harbour towards the light-house), *Massey Street Dispensary. Ereko Dispensary. New Maternity Home* (in preparation).

Massey Street Dispensary.

For native officials and non-paying natives; opened in 1902 and enlarged in 1914. Five rooms, including a waiting room, compounding room, consulting room, room for examination of patients and minor operations, store, etc.

In 1903 the number of cases treated was about 2,800.

In 1913 the number of cases treated was over 7,500, with a daily number at present of 60 to 80 patients.

Ereko Dispensary.

In the western part of the town, up to 1913, used as a Medical and Surgical extern department, but now a Vaccination Centre, with a Vaccinating Station at Ebute Ero ; serves Lagos town and villages in the Municipal Area and Apapa.

Present number of vaccinators employed is eight.

1913, number of vaccinations, 20,615.

1914, a monthly average of 1,900–2,000.

Additions to the building have recently been made and it is about to be re-opened as a dispensary.

7.—DISTANCE FROM HEADQUARTERS AND MEANS OF TRANSPORT.

Lagos is at present Headquarters Station. The distance from Kaduna, the future seat of the combined administration, is about 620 miles by rail.

8.—SEGREGATION OF EUROPEANS FROM NATIVES.

The majority of non-official Europeans enjoy no segregation from the vicinity of natives, and some even occupy dwellings in close proximity to natives of poor class.

The district embracing the Race-course and eastern part of the Marina to Five Cowrie Creek is regarded as a segregated area, and contains most of the Quarters built for Government officials. In a general sense it may be said that European officials from Government House to Magazine Point, and in houses adjoining the Golf-course, viz., on Force Road and Five Cowrie Creek, have the advantage of removal from native dwellings, apart from servants. Most houses bordering the Race-course are within the radius of a few hundred feet from streets occupied entirely by natives.

9.—EUROPEAN OFFICIAL AND UNOFFICIAL POPULATION.

(*Vide* Census, 1911.)

Lagos Municipal Area, *officials* about 250 and *non-officials* about 300 (exclusive of those on ships).

10.—NATIVE POPULATION.

Officials about 600 (excluding soldiers, police, etc.) ; non-officials about 76,000.

X.—IDENTIFICATION OF BLOOD-SUCKING INSECTS.

ABO.

<i>Glossina palpalis.</i>	<i>Hæmatopota torquens.</i>
„ <i>pallicera.</i>	<i>Anopheles costalis.</i>
„ <i>longipalpis.</i>	„ <i>funestus.</i>
„ <i>tachinoides.</i>	„ <i>mauritianus.</i>
„ <i>caliginea.</i>	<i>Culiciomyia nebulosa.</i>
<i>Tabanus fasciatus.</i>	<i>Mansonioides uniformis.</i>
„ <i>secedens.</i>	„ <i>africanus.</i>
„ <i>tæniola.</i>	<i>Stegomyia fasciata.</i>
„ <i>socialis.</i>	<i>Culex quasigellidus.</i>
<i>Rhinomyza stimulans.</i>	

AFIKPO.

<i>Tabanus fasciatus.</i>	<i>Anopheles funestus.</i>
„ <i>secedens.</i>	<i>Glossina palpalis.</i>
„ <i>socialis.</i>	<i>Hippocentrum trimaculatum.</i>
„ <i>tæniola.</i>	<i>Mansonioides uniformis.</i>
„ <i>thoracinus.</i>	<i>Culex grahami.</i>
<i>Anopheles costalis.</i>	<i>Culiciomyia nebulosa.</i>

AGBOR.

<i>Glossina palpalis.</i>	<i>Chrysops silacea.</i>
„ <i>pallicera.</i>	

AHOADA.

<i>Tabanus fasciatus.</i>	<i>Chrysops dimidiata.</i>
„ <i>secedens.</i>	„ <i>longicornis.</i>
„ <i>socialis.</i>	<i>Rhinomyza stimulans.</i>
<i>Chrysops silacea.</i>	

ARO.

<i>Tabanus tæniola.</i>	<i>Stomoxys calcitrans.</i>
„ <i>subangustus.</i>	<i>Subpangonia graroti.</i>
„ <i>fasciatus.</i>	<i>Hippobosca maculata.</i>
<i>Hæmatopota tenuicrus.</i>	<i>Culicoides grahami.</i>
„ <i>laccessens.</i>	<i>Anopheles costalis.</i>
<i>Hippocentrum versicolor.</i>	„ <i>funestus.</i>
<i>Chrysops longicornis.</i>	<i>Mansonioides uniformis.</i>
<i>Simulium damnosum.</i>	„ <i>africanus.</i>
<i>Culex duttoni.</i>	<i>Stegomyia fasciata.</i>
„ <i>decens.</i>	<i>Hæmaphysalis leachi.</i>
„ <i>tigripes</i> var <i>fusca.</i>	<i>Boophilus decoloratus.</i>
<i>Glossina palpalis.</i>	<i>Amblyomma variegatum.</i>
„ <i>fusca.</i>	<i>Rhipicephalus sanguineus.</i>
„ <i>longipalpis.</i>	<i>Ctenocephalus canis.</i>
<i>Stomoxys nigra.</i>	

BADAGRY.

<i>Tabanus par.</i>	<i>Hippocentrum versicolor.</i>
„ <i>fasciatus.</i>	<i>Culex insignis.</i>
„ <i>secedens.</i>	„ <i>duttoni.</i>
„ <i>socialis.</i>	„ <i>guiarti.</i>
„ <i>besti.</i>	<i>Anopheles costalis.</i>
„ <i>tæniola.</i>	<i>Toxorhynchites brevipalpis.</i>
„ <i>thoracinus.</i>	<i>Mansonioides uniformis.</i>

BADAGRY—continued.

Mansonioides africanus.
Dermatophilus penetrans.
Ctenocephalus canis.
Glossina palpalis.
 „ *submorsitans*.
 „ *longipalpis*.
 „ *caliginea*.
 „ *fusca*.
Chrysops dimidiata.
Hæmatopota torquens.

Stomoxys calcitrans.
Stegomyia fasciata.
 „ *africana*.
Culiciomyia nebulosa.
Hodgesia sanguinis.
Ochlerotatus nigricephalus.
Amblyomma variegatum.
Hæmaphysalis leachi.
Rhipicephalus sanguineus.

BENDE.

Tabanus kingsleyi.
 „ *williamsi*.
 „ *besti*.
 „ *tæniola*.
 „ *par*.
Culex decens.
 „ *duttoni*.
 „ *tigripes* var *fusca*.
Anopheles costalis.
 „ *funestus*.
Mansonioides uniformis.
 „ *africanus*.
Rhipicephalus sanguineus.

Hæmaphysalis leachi.
Glossina palpalis.
 „ *fusca*.
Hippocentrum trimaculatum.
Chrysops silacea.
Culicoides grahami.
Stegomyia fasciata.
 „ *africana*.
 „ *apicoargentea*.
 „ *luteocephala*.
Eretmopodites leucopus.
Culiciomyia nebulosa.
Ctenocephalus canis.

BENIN.

Tabanus besti.
 „ *billingtoni*.
 „ *combustus*.
 „ *thoracinus*.
 „ *obscurehirtus*.
 „ *secedens*.
 „ *fasciatus*.
Stomoxys calcitrans.
 „ *nigra*.
Culex duttoni.
 „ *tigripes* var *fusca*.
Stegomyia fasciata.
Culiciomyia nebulosa.
Glossina palpalis.

Glossina pallicera.
 „ *caliginea*.
 „ *longipalpis*.
 „ *fusca*.
 „ *nigrofusca*.
Rhinomyza stimulans.
Chrysops silacea.
 „ *dimidiata*.
Mansonioides africanus.
 „ *uniformis*.
Anopheles pitchfordi.
Eretmopodites chrysogaster.
Rhipicephalus sanguineus.

BONNY.

Glossina palpalis.
Culex decens.
 „ *duttoni*.
 „ *invidiosus*.
 „ *quasigelidus*.
 „ *tigripes* var *fusca*.
Anopheles costalis.
Stegomyia fasciata.

Taniorhynchus aurites.
 „ *metallicus*.
 „ *annettii*.
Ochlerotatus nigricephalus.
 „ *irritans*.
Uranotaenia annulata.
 „ *cæruleocephala*.
Mimomyia plumosa.

BRASS.

Tabanus secedens.
 „ *socialis*.
 „ *thoracinus*.

Glossina palpalis.
Anopheles costalis.
Stegomyia fasciata.

BURUTU.

Stegomyia fasciata.

CALABAR.

Tabanus socialis.,, *secedens.*,, *besti.*,, *fasciatus.*,, *combustus.*,, *tæniola.**Simulium damnosum.**Culex insignis.*,, *duttoni.*,, *rima.*,, *tigripes* var *fusca.**Anopheles costalis.**Culiciomyia nebulosa.**Ochlerotatus domesticus.**Hodgesia sanguinis.**Glossina palpalis.**Glossina caliginea.*,, *pallicera.**Chrysops silacea.*,, *dimidiata.**Phlebotomus duboscqi.**Culicoides grahami.**Mansonioides uniformis.*,, *africanus.**Stegomyia fasciata.*,, *africana.**Mucidos mucidos.**Eretmopodites quinquevittatus.**Ingramia nigra.**Tæniorhynchus annettii.**Uranotænia cæruleocephala.*

DEGEMA.

Tabanus secedens.,, *socialis.*,, *thoracinus.*,, *fasciatus.*,, *obscurifumatus.**Culex duttoni.*,, *invidiosus.*,, *tigripes* var *fusca.**Ochlerotatus domesticus.*,, *nigricephalus.**Glossina palpalis.**Stomoxys omega.**Chrysops silacea.**Anopheles costalis.*,, *aureosquamiger.**Stegomyia fasciata.*,, *africana.**Culiciomyia nebulosa.**Mucidos mucidos.**Tæniorhynchus annettii.**Ingramia nigra.*

EKET.

Tabanus secedens.,, *socialis.*,, *obscurhirtus.*,, *obscurifumatus.*,, *combustus.**Culiciomyia nebulosa.**Glossina pallicera.**Glossina tachinoides.*,, *palpalis.*,, *caliginea.**Chrysops silacea.*,, *dimidiata.**Cimex lectularius.*

EPE.

Tabanus fasciatus.,, *secedens.*,, *socialis.*,, *thoracinus* (melanic form).*Chrysops longicornis.*,, *silacea.**Glossina palpalis.*,, *nigrofusca.*,, *caliginea.**Stegomyia fasciata.**Ingramia malfeyti.**Mansonioides uniformis.*

FORCADOS.

Tabanus fasciatus.,, *par.*,, *secedens.*,, *socialis.*,, *tæniola.*,, *thoracinus.**Culex decens.*,, *insignis.*,, *invidiosus.*,, *rima.*,, *thalassius.*,, *univittatus.*

FORCADOS—continued.

Culex fatigans.
Tæniorhynchus annettii.
Rhipicephalus sanguineus.
Glossina palpalis.
 „ *caliginea.*
Chrysops longicornis.
Colicoides grahami.
Anopheles costalis.

Anopheles funestus.
 „ *umbrosus.*
Stegomyia fasciata.
 „ *africana.*
Banksinella luteolateralis.
Ochlerotatus nigricephalus.
Culiciomyia nebulosa.
Ctenocephalus canis.

IBADAN.

Tabanus tæniola.
 „ *subangustus.*
Hæmatopota decora.
Hippocentrum versicolor.
Culicoides grahami.
Culex duttoni.
 „ *decens.*
 „ *tigripes* var *fusca.*
Rhipicephalus simus.
Glossina palpalis.

Stomoxys calcitrans.
 „ *nigra.*
 „ *inornata.*
Hippobosca maculata.
Simulium damnosum.
Anopheles costalis.
Culiciomyia nebulosa.
Boophilus annulatus.
Hæmaphysalis leachi.

IKOM.

Tabanus besti.
 „ *marmorosus.*
 „ *obscurehirtus.*
 „ *combustus.*
 „ *obscurefumatus.*
 „ *ruficrus.*
 „ *tæniola.*
 „ *secedens.*
 „ *fasciatus.*
 „ *obscurissimus.*
Mansonioides uniformis.
 „ *africanus.*
Glossina palpalis.

Glossina longipennis.
 „ *fusca.*
 „ *caliginea.*
 „ *tabaniformis.*
 „ *pallicera.*
 „ *tachinoides.*
Hæmatopota cordigera.
Hippocentrum trimaculatum.
Subpangonia grahami.
Chrysops silacea.
Anopheles costalis.
Uranotænia annulata.
Rhipicephalus sanguineus.

IKOT-EKPENE.

Glossina palpalis.
Anopheles pitchfordi.
Culex duttoni.
 „ *grahami.*
 „ *insignis.*

Culex tigripes var *fusca.*
Chrysops silacea.
Stegomyia fasciata.
Culiciomyia nebulosa.
Ctenocephalus canis.

ILESHA.

Tabanus ruficrus.
 „ *kingsleyi.*
 „ *pluto.*
 „ *besti.*
Rhinomyza stimulans.
Culex tigripes var *fusca.*
 „ *grahami.*
 „ *pipiens.*
 „ *quasigelidus.*
Mucidus mucidus.
Anopheles funestus.
Toxorhynchites brevipalpis.
Dermatophilus penetrans.
Rhipicephalus sanguineus.

Glossina palpalis.
 „ *longipalpis.*
 „ *fusca.*
Chrysops silacea.
Hæmatopota lacessens.
Stegomyia fasciata.
 „ *apicoargentea.*
Eretmopodides quinquevittatus.
 „ *inornatus.*
Banksinella luteolateralis.
Culiciomyia nebulosa.
Ctenocephalus canis.
Hæmaphysalis leachi.

ITU.

Glossina palpalis.
Chrysops silacea.

Tabanus secedens.

LAGOS.

Tabanus billingtoni.
 „ *ditceniatus.*
 „ *fasciatus.*
 „ *ruficrus.*
 „ *laverani.*
 „ *par.*
 „ *pluto.*
 „ *secedens.*
 „ *subangustus.*
 „ *taeniola.*
 „ *thoracinus.*
 „ *biguttatus.*
 „ *socialis.*
Culicoides grahami.
 „ *milnei.*
 „ *distinctipennis.*
Ctenocephalus canis.
Xenopsylla cheopis.
Culex consimilis.
 „ *pruina.*
 „ *guiarti.*
 „ *grahami.*
 „ *quasigelidus.*
 „ *duttoni.*
 „ *tigripes* var *fusca.*
 „ *salisburyensis.*
 „ *decens.*
 „ *invidiosus.*
 „ *thalassius.*
 „ *rima.*
 „ *insignis.*
 „ *univittatus.*
 „ *fatigans.*
Ædomyia catastica.
Glossina palpalis.
 „ *pallicera.*
 „ *fusca.*
 „ *caliginea.*
 „ *tachinoides.*
Stomoxys calcitrans.
 „ *omega.*
 „ *nigra.*
Chrysops longicornis.
Hippocentrum versicolor.
Hippobosca maculata.
Rhipicephalus sanguineus.
 „ *simus.*
Amblyomma variegatum.
Boophilus decoloratus.

Boophilus australis.
Hyalomma ægypticum.
Aponomma exernatum.
Ochlerotatus caliginosus.
 „ *longipalpis.*
 „ *cumminsi.*
 „ *irritans.*
 „ *ochraceus.*
 „ *domesticus.*
 „ *punctothoracis.*
 „ *argenteopunctata.*
 „ *nigricephalus.*
 „ *minutus.*
 „ *marshalli.*
 „ *durbanensis.*
 „ *wellmani.*
Banksinella luteolateralis.
 „ *punctocostalis.*
Toxorhynchites brevipalpis.
Stegomyia fasciata.
 „ *africana.*
 „ *apicoargentea.*
 „ *luteocephala.*
 „ *argenteoventralis.*
Uranotenia balfouri.
 „ *cæruleocephala.*
 „ *annulata.*
 „ *mashonensis.*
 „ *bilineata* var *fraseri.*
Mansonoides uniformis.
 „ *africanus.*
 „ *mediolineata.*
Culicomyia nebulosa.
Micrædes inconspicuus.
Anopheles costalis.
 „ *funestus.*
 „ *umbrosus.*
 „ *mauritanus.*
 „ *pharænsis.*
Taniorhynchus aurites.
 „ *annettii.*
 „ *metallicus.*
Eretmopodites inornatus.
 „ *quinquevittatus.*
Mimomyia mimomyiaformis.
 „ *splendens.*
Ingramia nigra.
 „ *uniformis.*

OBAN.

Glossina fusca.
 „ *tabaniformis.*
Chrysops silacea.

Tabanus fasciatus.
 „ *obscurefumatus.*

OBODU.

Hippocentrum versicolor.
Amblyomma variegatum.
Boophilus decoloratus.
Hyalomma aegypticum.

Rhipicephalus cuspidus.
 „ *appendiculatus.*
 „ *simus.*

OBUBRA.

Tabanus fasciatus.
 „ *combustus.*
 „ *secedens.*
 „ *besti.*
 „ *tæniola.*
 „ *thoracinus.*
Anopheles costalis.
 „ *funestus.*

Glossina palpalis.
 „ *fusca.*
Subpangonia gravoti.
Hæmatopota cordigera.
Chrysops silacea.
Rhipicephalus sanguineus.
Mansonioides uniformis.
 „ *africanus.*

OKIGWI.

Glossina palpalis.
Tabanus secedens.

Dermatophilus penetrans.
Hippocentrum trimaculatum.

OKWOGA.

Glossina palpalis.

ONDO.

Eurhipicephalus sanguineus.
Boophilus annulatus.

Ctenocephalus canis.

ONITSHA.

Tabanus fasciatus.
 „ *subangustus.*
Mansonioides uniformis.
 „ *africanus.*
Anopheles costalis.
 „ *funestus.*
Glossina palpalis.

Culex grahami.
 „ *invidiosus.*
Tieniorhynchus aurites.
Culicomyia nebulosa.
Hæmophysalis leachi.
Rhipicephalus sanguineus.
Ctenocephalus canis.

OPOBO.

Tabanus secedens.
 „ *socialis.*
 „ *tæniola.*
 „ *thoracinus.*
 „ *argentous.*
 „ *combustus.*
 „ *obscurehirtus.*
Culex guiarti.
 „ *fatigans.*
 „ *decens.*
 „ *invidiosus.*
 „ *rima.*

Culex grahami.
Glossina palpalis.
 „ *caliginea.*
Chrysops longicornis.
 „ *silacea.*
Culicoides grahami.
Stegomyia fasciata.
 „ *africana.*
Anopheles costalis.
Culicomyia nebulosa.
Cimex rotundatus.

OSHOGBO.

Tabanus subangustus.
 „ *quadrisignatus.*
 „ *tæniola.*
 „ *pluto.*

Hæmatopota decora.
 „ *torgens.*
 „ *tenuicrus.*
Stomoxys nigra.

OSHOGBO—continued.

<i>Stomoxys brunnipes.</i>	<i>Glossina longipalpis.</i>
<i>Culex decens.</i>	„ <i>fusca.</i>
„ <i>tigripes</i> var <i>fusca.</i>	<i>Chrysops silacea.</i>
„ <i>duttoni.</i>	„ <i>longicornis.</i>
„ <i>fatigans.</i>	<i>Hippobosca maculata.</i>
„ <i>guiarti.</i>	<i>Stegomyia fasciata.</i>
„ <i>zombaensis.</i>	„ <i>africana.</i>
„ <i>pruina.</i>	„ <i>apicoargentea.</i>
„ <i>grahami.</i>	„ <i>sugens.</i>
<i>Culiciomyia nebulosa.</i>	<i>Mansonioides uniformis.</i>
<i>Anopheles costalis.</i>	„ <i>africanus.</i>
„ <i>funestus.</i>	<i>Uranotaenia balfouri.</i>
„ <i>unbrosus.</i>	„ <i>mayeri.</i>
„ <i>rufipes.</i>	<i>Eretmopodites quinquevittatus.</i>
„ <i>mauritanus.</i>	<i>Ochlerotatus nigeriensis.</i>
„ <i>nili.</i>	<i>Ctenocephalus canis.</i>
„ <i>paludis.</i>	<i>Boophilus decoloratus.</i>
„ <i>marshalli.</i>	<i>Rhipicephalus simpsoni.</i>
<i>Glossina palpalis.</i>	„ <i>neavei.</i>
„ <i>tachinoides.</i>	

OYO.

Hæmatopota decora.

OWERRI.

Tabanus socialis. *Hæmaphysalis leachi.*

SAPELE.

Glossina palpalis. *Culex duttoni.*
Chrysops silacea. *Stegomyia fasciata.*
Hæmatopota cordigera. *Culiciomyia nebulosa.*

WARRI.

Tabanus fasciatus. *Ochlerotatus cumminsi.*
 „ *tæniola.* *Glossina palpalis.*
 „ *secedens.* *Anopheles costalis.*
Culex duttoni. *Stegomyia fasciata.*
 „ *decens.* „ *africana.*
 „ *invidiosus.* *Culiciomyia nebulosa.*
 „ *tigripes* var *fusca.* *Teniorhynchus annettii.*
 „ *pruina.*

IDENTIFICATION OF INSECTS.

COLLECTED IN WEST AFRICA, BY DR. J. M. DALZIEL, AND SUBMITTED BY
DR. J. H. ASHWORTH.

 DIPTERA.
Culicidæ.

Culex thalassius, Theo.—6 M, 7 F, bred from pools in Lewis St., Lagos, 28.9.14; 1 M, in house, Lagos, 24.9.14; 2 F, in house, Lagos, 3 and 4.10.14; 1 M, in stable, 7.10.14; 4 M, 3 F, bred from pools, I'gbo village, Lagos Island, 3.10.14.

Culex insignis, Carter—3 F, in hospital stable, Lagos, 1.10.14.

Culex invidiosus, Theo.—4 F, in houses, Lagos, 28.9.14 and 2.10.14.

Culex rima, Theo.—3 F, in house and stables, Lagos, 9 and 10.1914.

Culex decens, Theo.—1 M, 1 F, bred from hole in ground, Lagos, 2.9.14; 1 F, in house, Lagos, 10.10.14.

Culex fatigans, Wied.—1 M, in house, Lagos, 24.9.14.

Culiciomyia nebulosa, Theo.—1 F, in house, Lagos, 28.9.14.

Ochlerotatus irritans, Theo.—1 M, in house, Lagos, 28.9.14; 1 F, in stable, Lagos, 5.10.14.

Uranotænia annulata, Theo.—3 F, Lagos.

Chironomidæ.

Culicoides milnei, Aust.—13, Lagos.

Ceratopogon sp.—1, Abinsi, Gold Coast, 2.10.12.

 COLEOPTERA.
Tenebrionidæ.

Alphitobius lœvigatus, F.—Sherbro, Sierra Leone; a cosmopolitan flour beetle.

XI.—SURGICAL OPERATIONS PERFORMED DURING THE
YEAR 1914.

LAGOS HOSPITAL.

Disease.				Operation.				Number.
Lacerated wounds	...	...	...	Repair	...	...	...	12
Compound fracture, tibia	...	...	...	Repair	...	...	...	2
Dislocation, shoulder	...	...	...	Reduced	...	...	...	1
„ astragalus	...	...	...	Astragalectomy	...	...	...	1
Amputations, fingers	...	...	...	Amputation	...	...	...	3
„ leg	...	...	...	Farabœuf	...	...	...	2
„ foot	...	...	...	Syme's	...	...	...	1
„ toe	...	...	...	Amputation	...	...	...	2
„ thigh	...	...	...	„	...	...	...	1
„ arm	...	...	...	„	...	...	...	1
Foreign body	...	...	...	Excised	...	...	...	2
Perforating wound, abdomen	...	...	...	Laparotomy	...	...	...	1
<i>Filaria loa</i> in eye	...	...	...	Excised	...	...	...	1
Cataract	...	...	...	Excision of lens	...	...	...	1
Ophthalmia	...	...	...	Enucleation	...	...	...	1
Wound of cornea	...	...	...	Iridectomy	...	...	...	1
Cirrhosis of liver	...	...	...	Laparotomy	...	...	...	1
Appendicitis	...	...	...	Appendicectomy	...	...	...	1
				Laparotomy	...	...	...	1
Hernia, simple Inguinal	...	...	...	Radical cure	...	...	...	44
„ strangulated	...	...	...	„ „	...	...	...	5
„ ventral	...	...	...	„ „	...	...	...	1
Hæmorrhoids	...	...	...	Ligature	...	...	...	7
Rectal prolapse	...	...	...	Excised	...	...	...	1
Fistula in ano	...	...	...	Opened and carbolized	...	...	...	5
Fissure in ano	...	...	...	Division of sphincter	...	...	...	2
Abscess	...	...	...	Opened and drained	...	...	...	78
Adenitis	...	...	...	Excision of glands	...	...	...	11
Varicose veins	...	...	...	Trendelenberg and local excision	...	...	...	3
Arthritis	...	...	...	Arthrotomy	...	...	...	6
Osteomyelitis	...	...	...	Osteotomy	...	...	...	11
Caries of rib	...	...	...	Resection of rib	...	...	...	1
Phimosis	...	...	...	Circumcision	...	...	...	26
Hydrocele	...	...	...	Radical cure	...	...	...	16
Hydrocele of cord	...	...	...	Excision	...	...	...	1
Stricture of urethra	...	...	...	Dilatation...	...	...	...	7
				Ext. urethrotomy	...	...	...	1
				Supra-pubic cystotomy	...	...	...	1
Hæmatocele	...	...	...	Radical cure	...	...	...	2
Endometritis	...	...	...	Curettage	...	...	...	2
Fibro-myoma	...	...	...	Myomectomy	...	...	...	1
Ovarian cyst	...	...	...	Hysterectomy and excision	...	...	...	1
Pyonephrosis	...	...	...	Nephrotomy	...	...	...	1
Chronic ulcer	...	...	...	Curetting	...	...	...	2
				Skin graft	...	...	...	1
Simple tumours	...	...	...	Excision	...	...	...	9
Malignant tumours	...	...	...	„	...	...	...	2
				Partial excision	...	...	...	1
Total								285

ST. MARGARET'S HOSPITAL, CALABAR.

Disease.				Operation.				Number.
Abscess	Incision	...	...	22
Hernia	Radical cure	...	...	16
Bullet wounds	Drainage	...	...	9
„ „	Extraction	...	...	2
Lacerated wounds, fingers	Amputation	...	...	3
„ „ leg	„	1
„ „	Stitched	...	...	2
Phimosis	Circumcision	...	...	8
Hydrocele	Radical cure	...	...	4
Stricture	Supra-pubic puncture	...	...	2
„	Dilatation...	...	...	2
Ruptured urethra	Cystotomy	...	...	1
Perineal fistula	Wheelhouse operation	...	...	1
Retroversion of uterus	Replacement	...	...	2
Elephantiasis vulvae	Removal	...	...	1
Adenitis	Glands removed	...	...	10
Ulcers	Scraped	...	...	4
Liver abscess	Drained	...	...	1
Thoracic abscess	Explored	...	...	1
Hæmorrhoids	Radical cure	...	...	1
Fæcal fistula	Repaired	...	...	1
Guinea-worm	Incision	...	...	1
Tumours	Removal	...	...	3
Strangulated hernia	Herniotomy	...	...	1
Total								99

DEGEMA HOSPITAL.

DISEASE.					OPERATION.			NUMBER.
Hernia ...	...	...	...	...	Radical cure	...	...	8
Osteitis	...	...	...	...	Removal of sequestrum	...	...	2
Caries, upper maxilla	...	...	...	...	Removal of dead bone	...	...	1
Cellulitis	...	...	...	...	Scraping	...	...	3
Ulcer ...	...	...	...	...	„	...	...	1
Injury, limb and finger	...	...	...	...	Amputation	...	...	4
Punctured wound of abdomen	...	...	...	...	Removal of portion of omentum and return of intestines	...	...	1
Elephantiasis scroti	...	...	...	...	Excision	...	...	1
Hydrocele	...	...	...	...	Radical cure	...	...	1
Caries of tooth and alveolæ	...	...	...	...	Extraction	...	...	1
Phimosis	...	...	...	...	Circumcision	...	...	3
Lipoma	...	...	...	...	Removal of	...	...	1
Ganglion	...	...	...	...	Excision	...	...	1
					Total	...	...	28

EKET HOSPITAL.

Disease.					Operation.			Number.	
Hernia ...	...	...	...	...	Radical cure	...	...	...	6
Fistula in ano	...	...	...	...	Incision	...	...	...	1
Elephantiasis	...	...	...	...	Excision	...	...	...	3
Calculus	...	...	...	...	External urethrotomy	...	...	...	1
Hydrocele	...	...	...	...	Radical	...	...	...	5
Others ...	...	...	...	...	—	...	...	...	7
					Total	...	...	...	23

OPOBO HOSPITAL.

Disease.	Operation.	Number.
Forearm, injury to	Amputation	1
Abscess of liver	Incision and drainage	1
Enchondroma	Removal	1
Lipoma	”	2
Hæmorrhoids	Incision	1
Parturition	Delivery, forceps	1
Elephantiasis	Removal	2
Circumcision	—	13
Total		<u>22</u>

FORCADOS HOSPITAL.

Disease.	Operation.	Number.
Crushed fingers	Amputation of fingers	2
Gangrene of foot	Amputation of leg (left) six inches below the knee	1
Osteitis	Incision and drainage	1
Abscess	”	1
Hydrocele	Tapping	1
Abscess	(Opened under local anæsthetic)	9
New growth	Removal of	1
Retro-cæcal abscess	Incision and drainage	1
Hydrocele	Aspiration and injection	1
Total		<u>18</u>

IBADAN HOSPITAL.

Disease.	Operation.	Number.
Injury to leg	Amputation	2
Hernia	Radical cure	4
Tumours, malignant	Excised	2
” innocent	”	2
Abdominal disease	Laparotomy	1
Adenitis	Excision	2
Cataract	”	1
Total		<u>14</u>

WARRI, SAPELE, ONITSHA HOSPITALS.

Disease.	Operation.	Number.
Hernia	Radical cure	12
Abscess of connective tissue	Incision and drainage, opening, &c.	169
Cellulitis	Incision and drainage, opening, &c.	122
Suppuration of lymphatic gland	Incision (5), scraping and drain- age (23)	28
Cataract	Removal of lens	2
Inflammation of lymphatic gland	Incision and drainage	14
Local injuries	Partial amputation, scraping, &c.	10
General injuries	Amputation, removal of bullet, &c.	15
Imperforate anus	Imperforate anus	1
Ainhum	Amputation of toes	4
Lipoma	Excision	1
Goitre	Removal	1

Disease.	Operation.	Number.
Varicocele	Removal of veins	2
Septic wound of scrotum	Scraping	1
Elephantiasis of „	Removal of tumour	5
Ulcers	Scraping	4
Fistula	Incision and scraping	1
Necrosis of bone	Removal of sequestrum	2
Dracunculus	Extraction (4), Incision and drainage (2)	6
Appendicitis	Removal of appendix	2
Balanitis	Partial circumcision	2
Endometritis	Curetting	2
Tumours	Removal of	6
Fibromata	Excision	3
Bright's	Paracentesis	3
Compound fracture	Setting	1
Hydrocele	Radical cure	3
Stricture	Dilatation—External urethotomy	2
Enchondroma	Excision	1
Necrosis	Scraping	1
Phimosis	Circumcision	3
Delayed labour	High forceps	1
Fibro-sarcoma of foot... ..	Amputation	1
Lipomata	Excised	3
Trauma of toe	Amputation	1
Ascites	Paracentesis, abdominis	6
Obstruction of bowel	Laparotomy	1
Foreign body, arm	Extraction	1
<i>Filaria loa</i>	Extraction from eye	1
Boil	Incision	5
Cirrhosis	Paracentesis abdominis	3
Abscess of brain	Incision of abscess and drainage	1
Gunshot wound	Sequestrotomy	2
Total		455

OTHER HOSPITALS.

Disease.	Operation.	Number.
Tumours	Excision	7
Phimosis	Circumcision	1
Ganglion	Removed	4
Injuries to limbs	Amputation	8
Ruptured perinaeum	Repair	1
Hernia	Radical cure	5
Elephantiasis	Excision	3
Cataract	—	1
Others	—	50
Total		80

Grand Total 1,024

XII.—TABLES OF CASES OF MALARIAL FEVER.

EUROPEANS.

CASES.						DEATHS.					
1909.	1910.	1911.	1912.	1913.	1914.	1909.	1910.	1911.	1912.	1913.	1914.
763	817	696	800	707	641	5	7	1	4	3	3

NATIVES.

CASES.						DEATHS.					
1909.	1910.	1911.	1912.	1913.	1914.	1909.	1910.	1911.	1912.	1913.	1914.
5,404	6,132	6,448	7,523	6,288	4,528	19	10	17	24	19	4

TOTAL CASES OF MALARIA TREATED.

(EUROPEAN AND NATIVE.)

CASES.						DEATHS.					
1909.	1910.	1911.	1912.	1913.	1914.	1909.	1910.	1911.	1912.	1913.	1914.
6,167	6,949	7,144	8,323	6,995	5,169	24	17	18	28	22	7

XIII.—TABLES OF TRYPANOSOMIASIS CASES.

EUROPEANS.

CASES.			DEATHS.		
1912.	1913.	1914.	1912.	1913.	1914.
—	—	*1	—	—	—

* Transferred from Northern Provinces.

NATIVES.

CASES.			DEATHS.		
1912.	1913.	1914.	1912.	1913.	1914.
153	378	176	8	6	6

TABLES OF BLACKWATER FEVER CASES.

EUROPEANS.

CASES.						DEATHS.					
1909.	1910.	1911.	1912.	1913.	1914.	1909.	1910.	1911.	1912.	1913.	1914.
31	34	26	23	26	20	10	7	8	4	6	5

NATIVES.

CASES.						DEATHS.					
1909.	1910.	1911.	1912.	1913.	1914.	1909.	1910.	1911.	1912.	1913.	1914.
—	—	—	—	*2	†2	—	—	—	—	—	‡1

* One West Indian and one native boy aged 12 years.

† One West Indian and one Syrian.

‡ Syrian.

XIV.—TABLES OF YELLOW FEVER CASES.

EUROPEANS.

CASES.			DEATHS.		
1912.	1913.	1914.	1912.	1913	1914.
—	17	8	—	9	4

NATIVES.

CASES.			DEATHS.		
1912.	1913.	1914.	1912.	1913.	1914.
—	21	—	—	—	—

TABLES OF FILARIASIS CASES.

EUROPEANS.

CASES			DEATHS.		
1912.	1913.	1914.	1912.	1913.	1914.
4	1	2	—	—	—

NATIVES.

CASES			DEATHS.		
1912.	1913.	1914.	1912.	1913.	1914.
92	62	30	—	—	—

XV.—TABLE SHOWING QUANTITY OF QUININE IN GRAINS,
ISSUED GRATIS FOR PROPHYLACTIC PURPOSES, WITH
COMPARISON WITH PREVIOUS YEARS.

1911.	1912.	1913.	1914.	Increase 1913-14.	Value.
2,346,447	2,000,743	1,948,330	2,165,732	217,402	£433 8 3

TABLE SHOWING RESULTS OF VACCINATION, WITH
COMPARISON WITH PREVIOUS YEARS.

1910.		1911.		1912.		1913.		1914.	
Number vaccinated.	Successful.	Number vaccinated.	Successful.	Number vaccinated.	Successful.	Number vaccinated.	Successful.	Number vaccinated.	Successful.
135,647	88,579	166,394	113,657	243,316	176,944	168,941	121,102	149,273	99,260